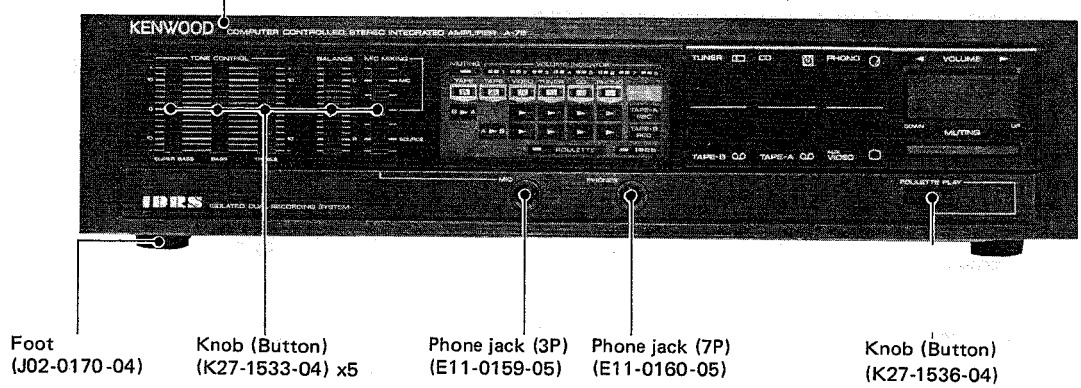
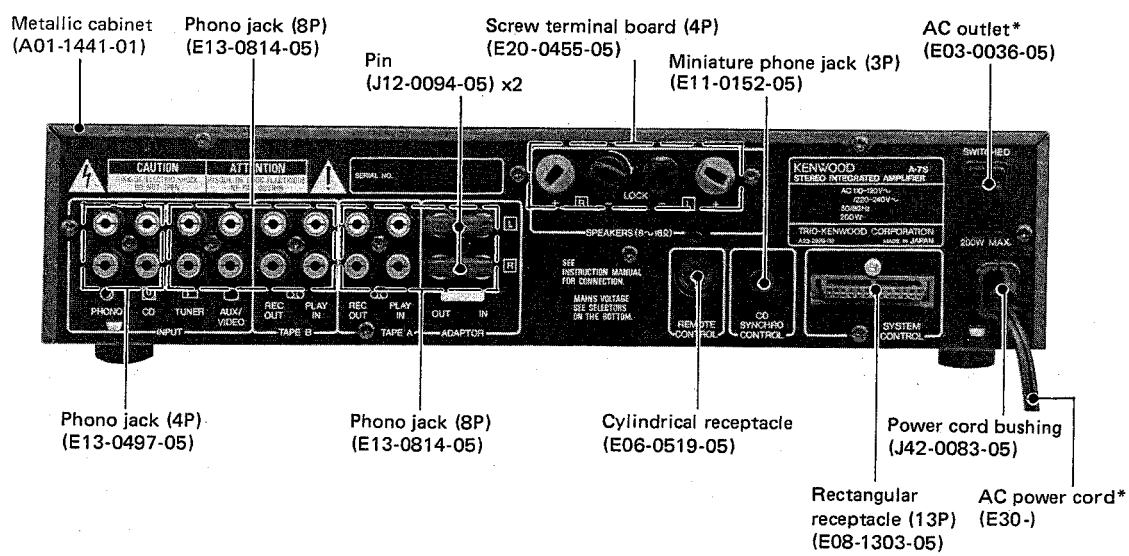
SERVICE MANUAL

KENWOOD

A-7S

COMPUTER CONTROLLED STEREO INTEGRATED AMPLIFIER





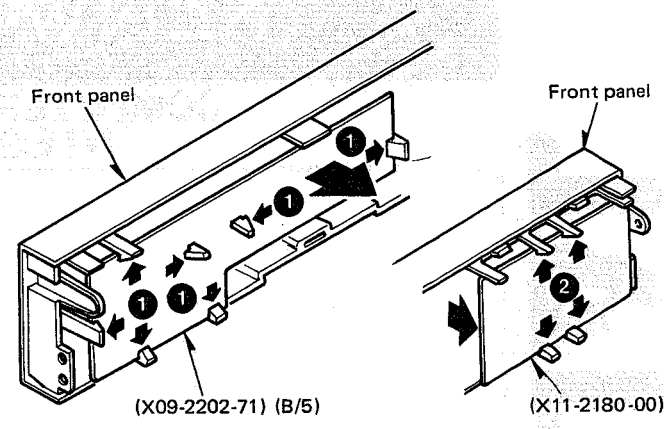
Caution When a repair to MIDI M-5S, MIDI M-7S is requested, be sure to advise the customer to ship together with amplifier A-7S.
See precautions for repair on back cover.

*Reter to parts list on page 24.

DISASSEMBLY FOR REPAIR

REMOVING THE PC BOARD (X09-2202-71)

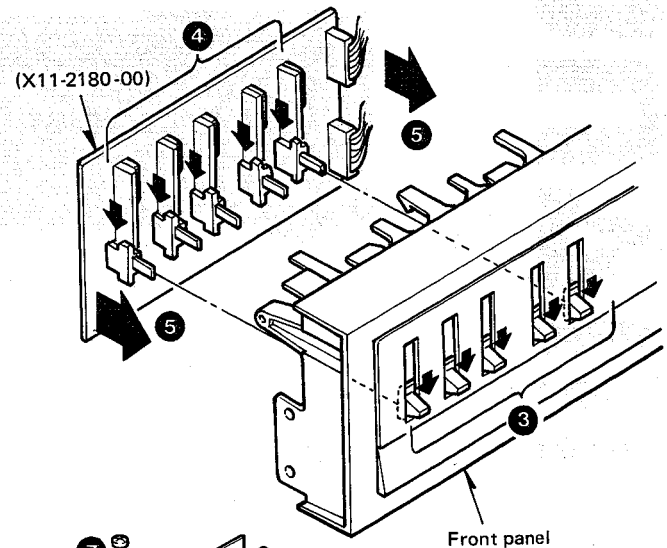
- Pressing the pawls of the front panel which are securing the PC board in the directions of arrows, remove the PC board (❶).



REMOVING AND REINSTALLING THE TONE UNIT (X11-2180-00)

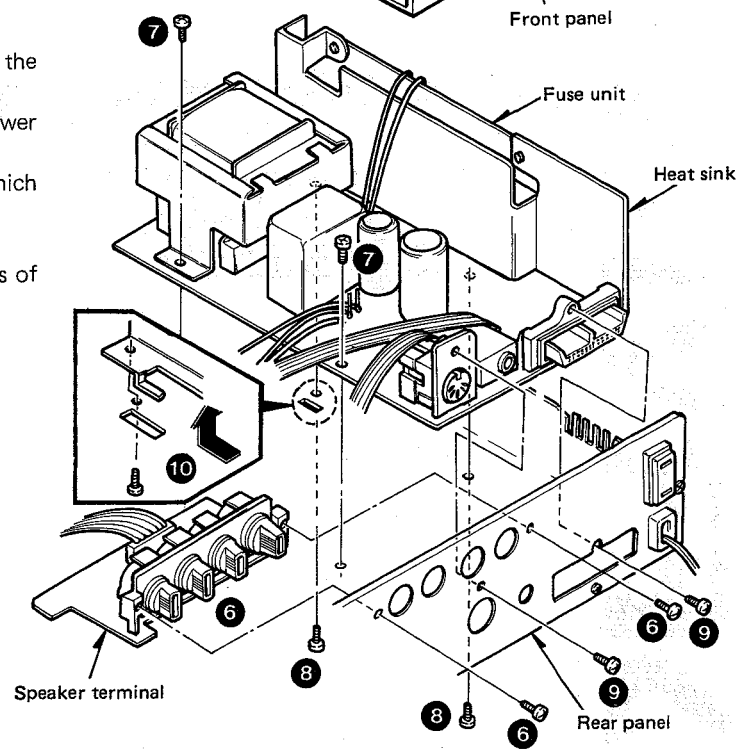
1. Pressing the pawls of the front panel which are securing the PC board in the directions of arrows, remove the PC board (❷).
2. When reinstalling the PC board, lower each knob on the panel side to the lowest position (❸), and move the shaft of each slide variable resistor to the position of the corresponding knob (❹). Press the PC board horizontally from the rear of the panel so that the pawls will catch it (❺).

- After reinstalling the PC board, confirm that the shafts of all the slide potentiometers are fixed to the knobs.

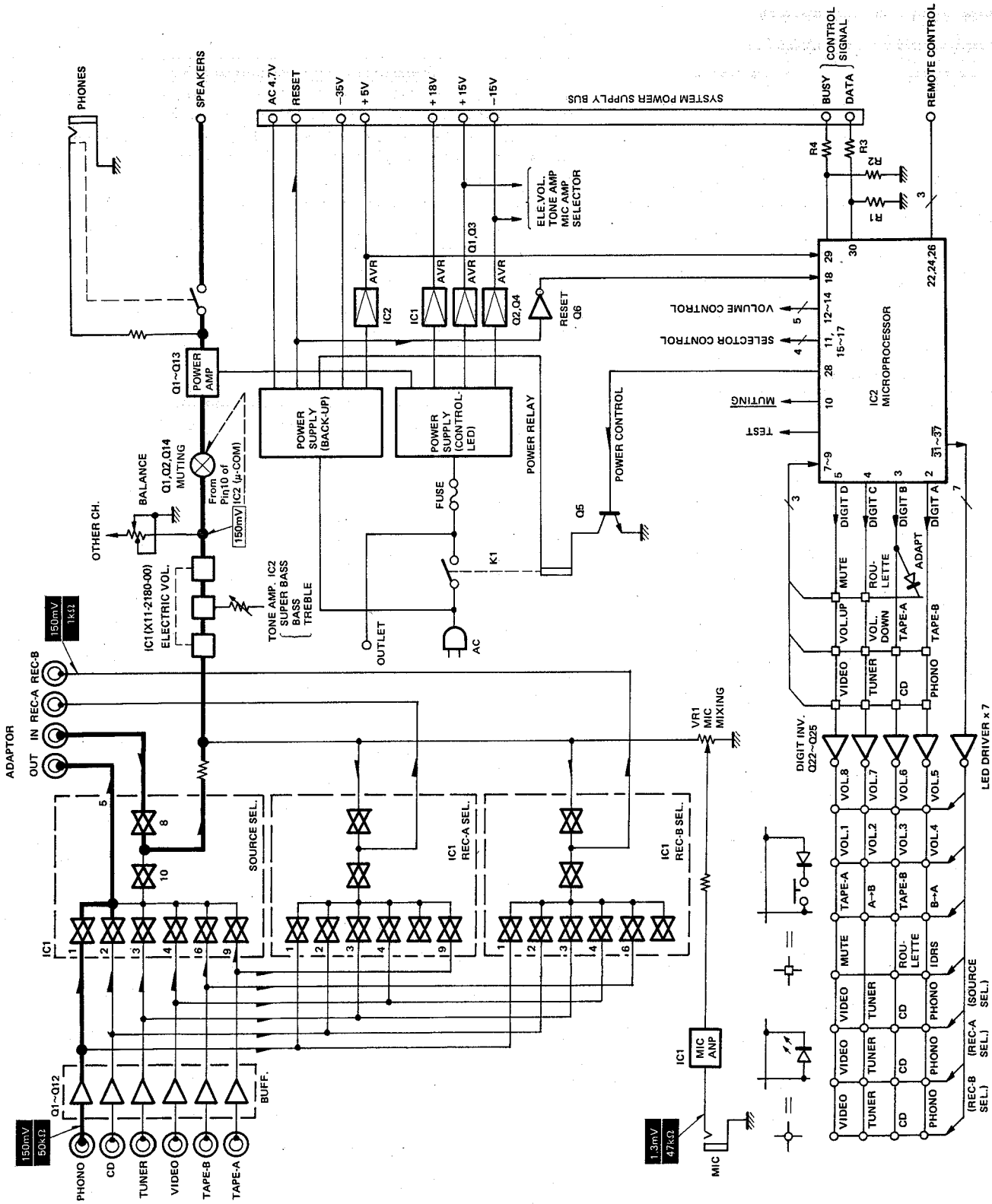


REMOVING THE POWER SUPPLY

1. Remove the two screws from the rear side to remove the speaker terminal unit (❻).
2. Remove the two screws from the top of the power supply (❼).
3. Remove the two screws from the bottom plate which are securing the heat sink (❽).
4. Remove the two screws from the rear panel (❾).
5. Lift the power supply paying attention to the pawls of the heat sink (❿).



BLOCK DIAGRAM



CIRCUIT DESCRIPTION

Description of components

POWER SUPPLY (X00-2362-71)

Components	Use and function	Operation/Condition/interchangeability
Q1	Constant voltage power supply	Power supply of + 16V. Supplies the power to the preamplifier in amplifier and the motors and plunger circuits of the cassette deck and turntable.
Q2	Constant voltage power supply	Power supply of −16V. Supplies the power to the preamplifier in amplifier and the motor of turntable and the audio section of the tuner.
Q3,Q4	Constant voltage	Driver of Q1 and Q2.
Q5	For driving the power supply relay	Drives the relay with the output of microprocessor.
Q6	For resetting the microprocessor	The microprocessor is kept turned on as long as it is plugged in. HI signal is output to the microprocessor when it is plugged in and out.
IC1	Constant voltage	3-terminal regulator for + 18V. Used for the signal systems of cassette deck and tuner.
IC2	Constant voltage	3-terminal regulator for + 5V. Power supply for the microprocessors of all the systems except for the CD player and graphic equalizer.

AUDIO (X09-2202-71)

Components	Use and function	Operation/Condition/Interchangeability
Q1,Q2	Muting	Operates at the following times : When the selector is changed over, When volume control is set to minimum.
Q3,Q4	Compensating the bias current	
Q5~Q8	Driver	
Q9~Q12	Final (60W)	
Q13	Constant voltage power supply for class A	Prevents the shock noises made when the power is turned on and off with the slow attack or fast release.
Q14	Inverter for muting	
Q15~Q21	Driver of LED	Inverts the output of microprocessor and drives LED.
Q22~Q25	Inverter for DIGIT	Inverts the DIGIT signal of microprocessor and drives LED with Q15~Q21. LED is divided into four, and they are turned on alternately at intervals of about 25ms.
IC1	Microphone amplifier	
IC2	Microprocessor	Performs the following processes : • Receives remote control signals from outside and convert them into serial data for communication. • Performs communication among devices of MIDI series. • Controls the selector. • Controls the electronic volume control. • Controls the power supply relay. • Controls the muting transistors (Q1 and Q2).

TONE (X11-2180-00)

Components	Use and function	Operation/Condition/Interchangeability
IC1	Electronic volume control	Receives the serial data from microprocessor and controls the sound volume. This IC performs −20dB muting, too.
IC2	Tone amplifier	3-element tone circuit of output composition type. Inserted between ATT1 and ATT2 of the electronic volume control, and used as a buffer amplifier, too.

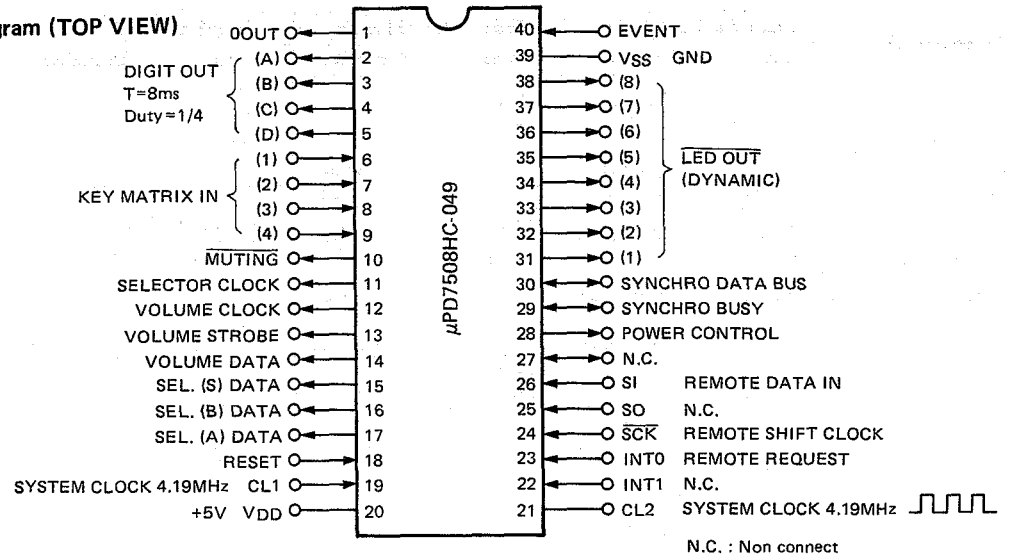
SUB (X13-5192-70)

Components	Use and function	Operation/Condition/Interchangeability
Q1~Q12	Buffer amplifier	Single-stange amplifier of emitter follower type. Prevents the shock noises made when changing to REC OUT in IDRS by the impedance conversion.

CIRCUIT DESCRIPTION

Microcomputer IC2 (μPD7508HC-049) : X09-2202-71

Terminal connection diagram (TOP VIEW)



Specifications of ports

Terminal No.	Terminal name and use	I/O	Input/Output condition
1	0 OUT : Unused		
2~5	DIGIT OUT (A)~(D)	O	Approx. 2msec. when turned on. Approx. 6msec. when turned off. Active at "H". Duty ratio : 1/4
6~9	KEY MTX. (1)~(4)	I	Receives inputs together with DIGIT OUT. Active at "H".
10	$\overline{\text{MUTING}}$	O	"H" 4.5sec after system power is turned on, and "L" just before the power is turned off. However, "L" when the selector is changed or volume control is minimized.
11	SEL. CLK.	O	Clock for driving the selector IC. Outputs only during operation.
12	VOL. CLK.	O	Clock for driving the electronic volume control IC. Outputs only during operation.
13	VOL. ST.	O	Strobe output for the electronic volume IC. For the detail, see "Electronic volume IC (TC9176P)" (page 0).
14	VOL. DATA	O	Serial data for the electronic volume IC. For the detail, see "Electronic Volume IC (TC9176P)" (page 0).
15	SEL. S DATA	O	Serial data for SOURCE selector IC. Outputs only at time of changeover.
16	SEL. B DATA	O	Serial data for REC OUT-B selector IC. Outputs only at time of changeover.
17	SEL. A DATA	O	Serial data for REC OUT-A selector IC. Outputs only at time of changeover.
18	RESET	I	Inputs just after turning on and before turning off the main power. Set to the initial state.
19	CL1	I	System clock (4.19MHz)
20	VDD		+ 5V power supply
21	CL2	O	System clock (4.19MHz)
22	INT1 : Unused		
23	PSHKY (INT0)	I	Interrupt input of remote control signal.
24	$\overline{\text{SCK}}$	I	Clock input of remote control signal
25	SO : Unused		
26	SI (SDT)	I	Serial data input of remote control
27	P60 : Unused		
28	PW. CONT	O	"H" when the system power is turned on, and "L" when it is turned off.
29	EO BUSY	I/O	Input/Output for easy operation communication. Output inhibit signal.
30	EO DATA	I/O	Input/Output for easy operation communication. Data bus.
31~34	DISP.MTX. I (1)~(4)($\overline{\text{LED OUT}}$)	O	Outputs the indication signal together with DIGIT OUT. Active at "L".
35~38	DISP.MTX. II (5)~(8)($\overline{\text{LED OUT}}$)	O	Outputs the indication signal together with DIGIT OUT. Active at "L".
39	VSS : GND		
40	EVENT : Unused		

-7S

CIRCUIT DESCRIPTION

Matrix table

Terminal name		DIGIT OUT (A) 2 pin		DIGIT OUT (B) 3 pin		DIGIT OUT (C) 4 pin		DIGIT OUT (D) 5 pin	
		Use	Condition	Use	Condition	Use	Condition	Use	Condition
KEY MTX.	6 pin (Test pin ④)	Test D VOL. MAX.	Test pin ⑧	Test C VOL. MIN.	Test pin ⑦	Test B All LED's are lit.	Test pin ⑥	Test A System is turned on.	Test pin ⑤
	7 pin	LOUDNESS	Turned on during "H".	ADAPTER	Turned on during "H"	ROULETTE	Tact S10	MUTE	Tact S9
	8 pin	TAPE-B	Tact S8	TAPE-A	Tact S7	VOL.DOWN	Tact S6	VOL. UP	Tact S5
	9 pin	PHONO	Tact S4	CD	Tact S3	TUNER	Tact S2	VIDEO	Tact S1
DISP. MTX. I	31 pin	VOL. 5	−10dB level	VOL. 6	−10~−6dB	VOL. 7	−6~−2dB	VOL. 8	When VOL. is at max. (0dB)
	32 pin	VOL. 4	−20dB level	VOL. 3	−30dB level	VOL. 2	−40dB level	VOL. 1	Below −50dB
	33 pin	TAPE-B→A (SEL. A)	D22	TAPE-B (SEL. S)	D21	TAPE-A→B (SEL. B)	D20	TAPE-A (SEL. S)	D19
	34 pin	I.D.R.	When SEL. I ~III are not the same	ROULETTE	Playing roulette	RANDOM	playing random	MUTE	At time of −20dB damping
DISP. MTX. II	35 pin	PHONO (SEL. S)	D29	CD (SEL. S)	D28	TUNER (SEL. S)	D27	VIDEO (SEL. S)	D26
	36 pin	PHONO (SEL. A)	D33	CD (SEL. A)	D32	TUNER (SEL. A)	D31	VIDEO (SEL. A)	D30
	37 pin	PHONO (SEL. B)	D37	CD (SEL. B)	D36	TUNER (SEL. B)	D35	VIDEO (SEL. B)	D34
	38 pin	LOUDNESS	Loudness control is turned on.	ADAPTER	Adapter is turned on.				

Note : The test mode will be explained later in detail.
Switches and LED related to the above LOUDNESS, ADAPTER, and RANDOM are not installed to the set.

Input/Output operation

- **When resetting**

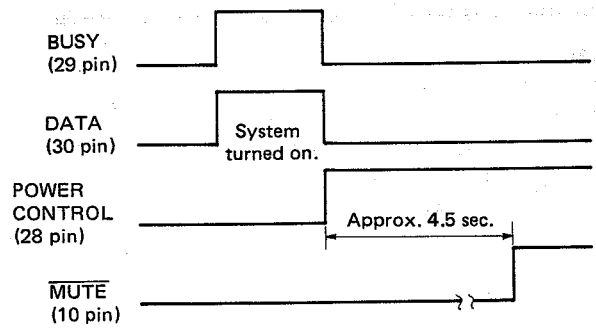
If RESET is input when the main power is turned on and off, the following controls are set as shown at right of them.

(a) SEL. S, A, B → TUNER
(b) VOLUME → −50dB
(c) MUTE (P53) → OFF
(d) BLANCE → CENTER
(e) IDR, ROULETTE, RANDOM → OFF
(f) The same operation as that performed when MUTING (P30) → SYSTEM POWER ON-OFF

CIRCUIT DESCRIPTION

- **When turning on the system**

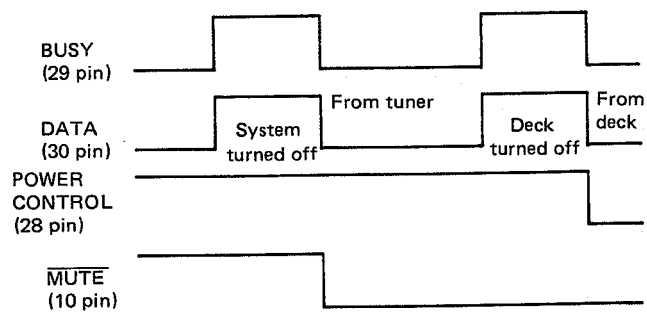
If the SYSTEM ON signal for the synchro data is received from the tuner, the power control terminal (28) is raised and the power is supplied to the outside. After about 4.5 seconds, the muting function is turned off. However, the volume control data before the system is turned on is $-\infty$, the muting function is not turned off.



- **When turning off the system**

If the SYSTEM OFF signal for the synchro data is received from the tuner, the muting function is turned on.

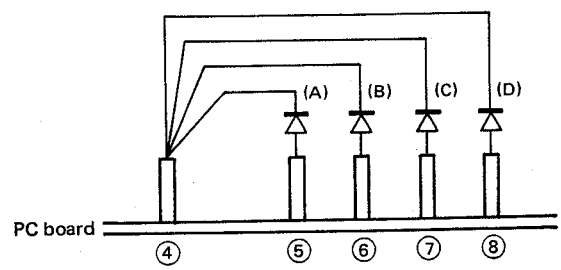
In case a record player has been connected, the power control is turned off to cut off the power supplied to the outside when the OFF signals for both record player and cassette deck are received. In case the record player has not been connected, the same operation is performed when the OFF signal for the cassette deck is received.



When a record player is not connected to the system

Test mode

Test pins ④, ⑤, ⑥, ⑦, and ⑧ on the circuit board correspond to ports 6, 5, 4, 3, and 2 of the microprocessor. The following test mode can be checked using each test pin. When performing the test, connect test pins ⑤ ~ ⑧ and ④ with diodes as shown in the figure at right. (Connect them so that ④ will be on the cathode side.)



Test	Test pin	Short/Open	Operation
A	④ & ⑤	Short	The system is turned on. The muting function operates for about 4.5sec.
		Open	System is turned off.
B	④ & ⑥	Short	All indicator LED's are lit.
		Open	Kept in normal state.
C	④ & ⑦	Short	VOLUME is set to $-\infty$ (MIN)
		Open	No change.
D	④ & ⑧	Short	VOLUME is set to 0dB (MAX)
		Open	No change.
E	④ & ⑦ & ⑧	Short	VOLUME is set to −40dB.
		Open	No change.

Note : Tests B ~ E are effective while the system is turned on.
Since A-7S is not equipped with the power switch, turn it on by itselb by press the four keys of [TUNER], [CD], [PHONO], [MUTING] switches. (However, it cannot be turned off by itself.)

-7S

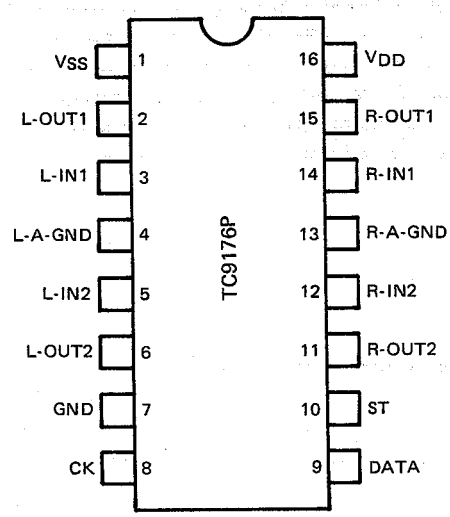
CIRCUIT DESCRIPTION

Electronic volume IC1 (TC9176P) : X11-2180-00

Outline

TC9176P is an electronic volume control IC which can control the sound volume by inputting a serial data from the outside. With this IC, the sound volume can be set from 0dB to −76dB with steps of 2dB or can be set to any one of 40 steps between 0dB and − ∞dB.

Terminal connection diagram (TOP VIEW)



Functions of terminal

Terminal No.	Symbol	Functions	Remarks
2 (L) 15 (R)	L-OUT 1 R-OUT 1	10dB attenuator output terminal. Signals applied to IN are damped to one of eight levels between 0 and 70dB with 10dB step.	(L/R) 2/15 3/14 4/13 5/12 6/11
3 (L) 14 (R)	L-IN 1 R-IN 1	10dB attenuator input terminal.	
4 (L) 13 (R)	A-GND	AC grounding terminal.	
5 (L) 12 (R)	L-IN 2 R-IN 2	2dB step attenuator input terminal.	
6 (L) 11 (R)	L-OUT 2 R-OUT 2	2dB step attenuator output terminal. Signals applied to IN are damped to one of five levels between 0~8dB with 2dB step.	
9	DATA	Terminal for inputting data of damping level and channel selection. 20 bit CK signal is input through pin 14 (VOL. DATA) of microprocessor IC2.	Low-threshold value input inverter
8	CK	Clock input terminal for receiving the data of DATA terminal. The data is input through pin 12 (VOL. CLK) of microprocessor IC2.	
10	ST	Strobe input terminal. The data of damping level and channel selection received from DATA and CK terminal are latched by setting this terminal to "H" level. If "H" level is not applied this terminal, the previous data are maintained. The data are input through pin 13 (VOL. ST) of microprocessor IC2.	
16	VDD	(+) power input terminal	
7	GND	Grounding terminal.	
1	Vss	(−) power input terminal.	

CIRCUIT DESCRIPTION

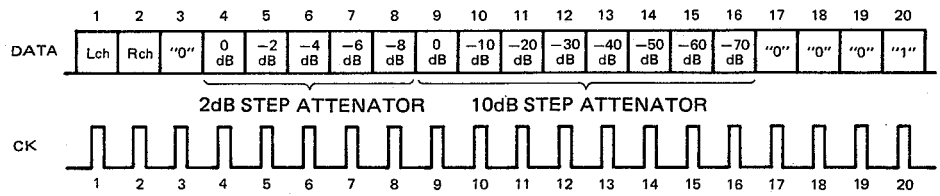
Operation

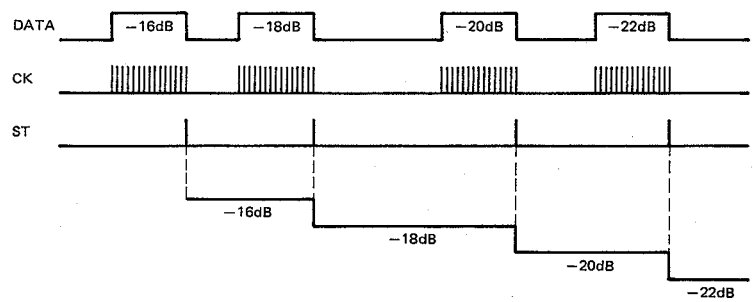
- **Setting the damping level**

The 20 bit data freely made is input through DATA, CK, and ST terminals to IC1 (TC9176P).

For example, if the data of (11001000001000000001) is input, the damping level is −22dB. Data bits 1 and 2 indicate the selection of Lch and Rch. Bits 4~8 are used to set the 2dB step attenuator and bits 9~16 are used to set the 10dB step attenuator. Bits 17~20 are the tip select bits. When they are (0001), the selection is performed, and when not, the selection is not performed.

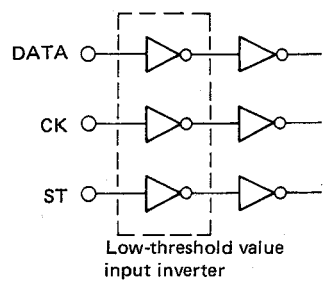
The damping to the infinite level is performed by inputting the data of −78dB. Therefore, the value one step higher than the infinite level is −76dB. The change of the received data is synchronized with the rise of ST signal.

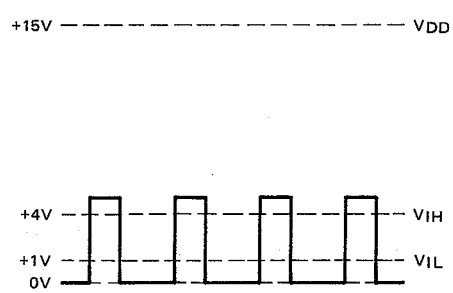




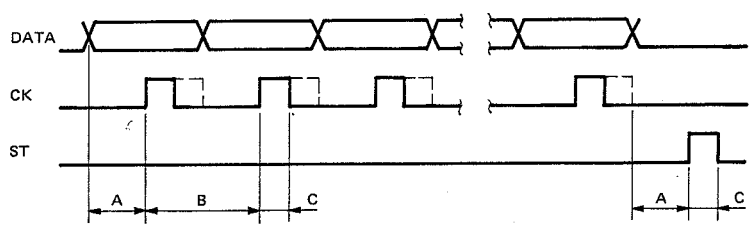
- **DATA, CK and ST input**

IC1 (TC9176P) is driven by two power sources of (+) and (−). Since it has a level shifter, DATA, CK and ST are operated by (+) power source only. Since the input inverter of these three terminals lowers the input threshold value, they are operated at 5V logical level.





DATA, CK and ST are executed according to the following schedule.



A≧1μs、B≧2μs、C≧1.0μs

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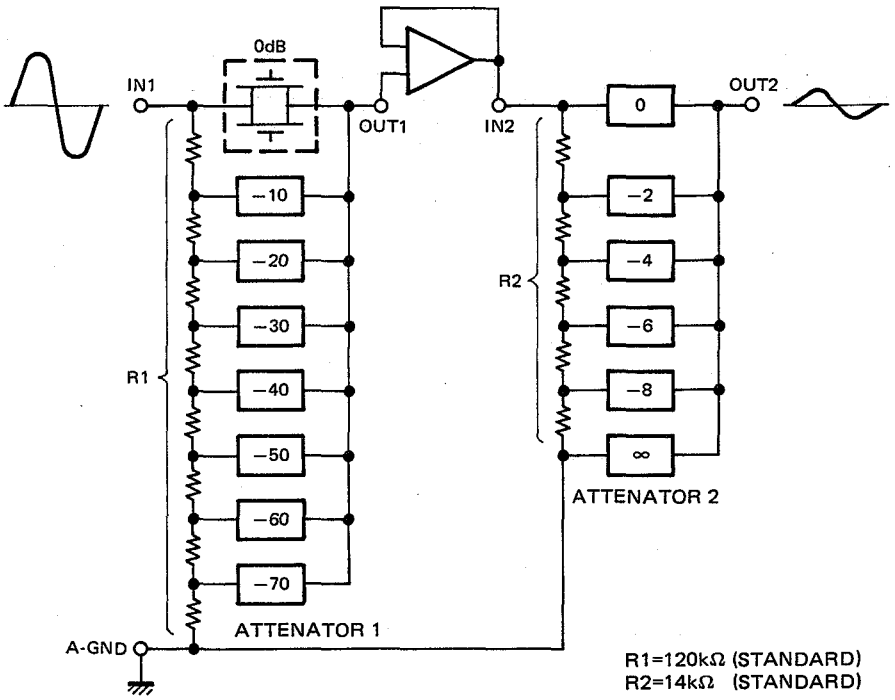
CIRCUIT DESCRIPTION

- **Attenuators**

Each attenuators is composed of the diffusion resistance array and analog switch. Attenuator 1 can damp to 0~70 dB with 10dB steps, and attenuator 2 can damp to 0~8dB with 2dB steps, thus they can damp to 0~76dB with 2dB steps.



CIRCUIT DESCRIPTION

Easy operation system

1. EO (Easy operation system) of ROXY D series

Each component of MIDI series is controlled by transferring 8 bit serial data through two common digital signal lines (BUSY and DATA).

The data trnsfer function is installed to the amplifier (A-7S), cassette deck (X-7WS), tuner (T-5S/T-5LS), turntable (P-7S and P-5S), and CD player (DP-770).

- **System components connections**

The easy operation connection of each component of MIDI series is realized with the system control connecting cable. This cable is composed of six types of power lines (BUSY/DATA). The six types of power lines are used to collect the power from all the power supply circuits to the amplifier A-7S and supply the power from the amplifier to each component. Necessary lines are selected from these ones and connected to the components (See Fig. 1–5~ 1–9). The two digital signal lines are used to perform the easy operation with the BUSY/DATA signals.

In the former MIDI system, the easy operation signals were sent and received between the amplifier and tuner, between the amplifier and cassette deck, and between the amplifier and record player through the respective synchro cable. However, in MIDI series, the microprocessors in the components connected to one another through the two digital signal lines (BUSY/DATA) contained in the system control connecting cable, and the information concerning the easy operation is carried by means of 8 bit serial transfer.

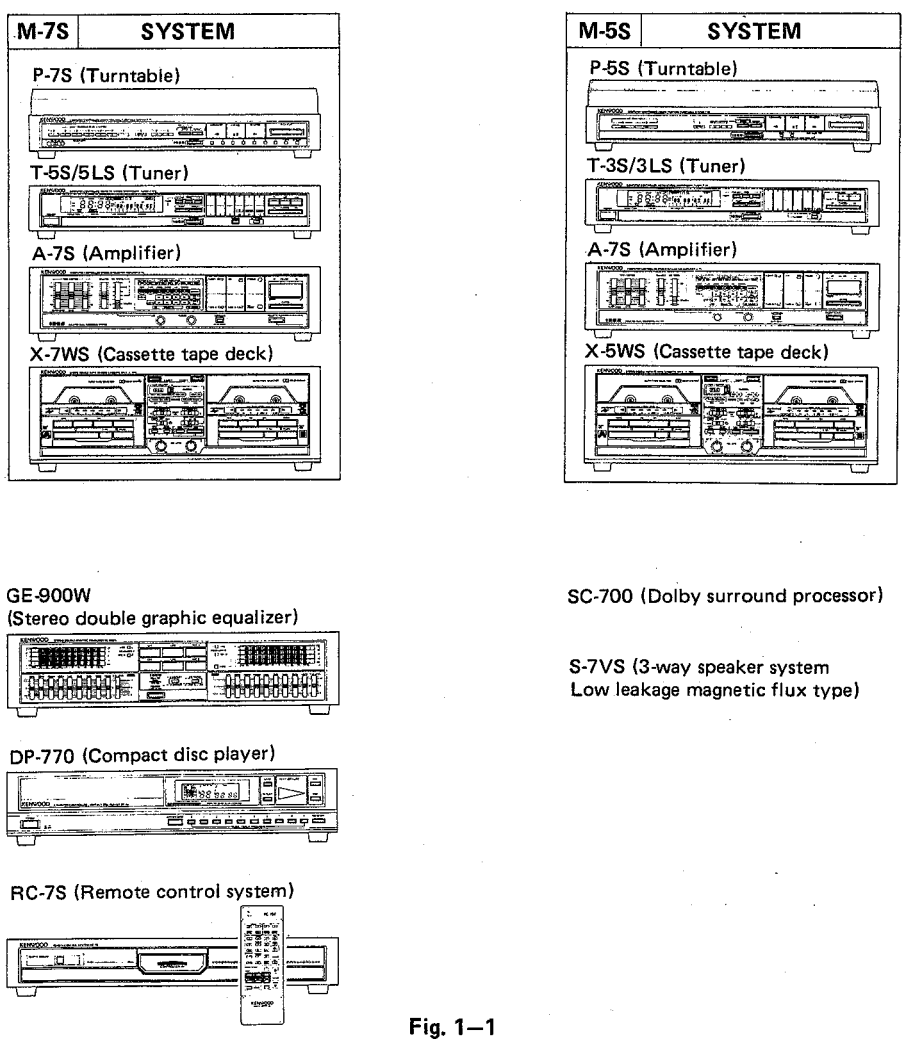


Fig. 1–1

CIRCUIT DESCRIPTION

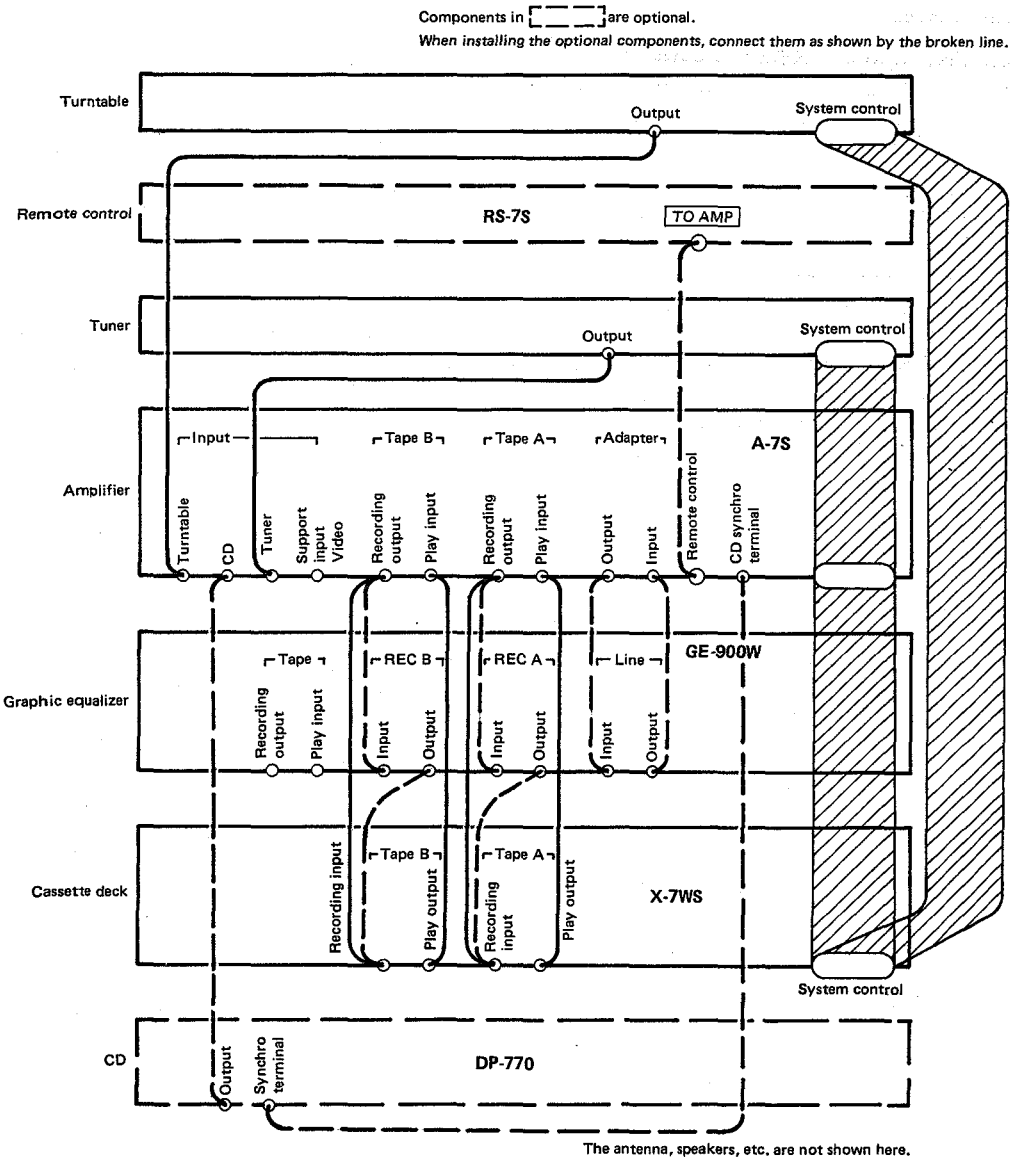
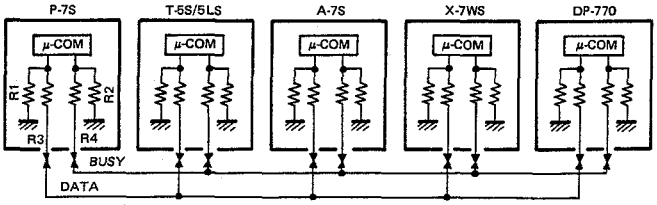


Fig. 1–2 System connection

- **Transfer of serial data**

As shown in the outline of the connection of the system, the microprocessors of the components are connected to one another through the BUSY/DATA digital signal lines. If the microprocessor of a component transmits a piece of information to another one, only the latter one is ready to receive the information and operate according to the serial data in that information.

According to the type of processing, the microprocessor on transmission side is turned on instead of the one on the receiving side to output a new serial data (BUSY/DATA) to the microprocessor which sent out the data at first or to perform another operation. In this way, the information required for the easy operation is transferred among the microprocessors.



R1, R2 (Pull-down resistor) 100kΩ
R3, R4 (Series resistor) 1kΩ (Only DP-7S has different ones)

Fig. 1–3 Outline of system connection

CIRCUIT DESCRIPTION

- **IDRS**

Fig. 1—4 shows the outline of the signal flow in a system of MIDI series. A-7S has two independent recording source changeover switches (REC A SEL./REC B SEL.) in addition to SOURCE SEL. SOURCE SEL. REC A SEL., and REC B SEL. are composed of microprocessor IC2 and function changeover IC (IC1) in the amplifier (A-7S).

The microprocessor in A-7S sends the control signal for changing the source selector to the function changeover IC (IC1) by operating the source changeover switch on the front panel.

X-7WS is a double-cassette recording/playing deck. Deck A and Deck B have the input/output terminals respectively on their back panel. In addition, each of them has an independent DOLBY recording/playing function. REC A SEL. and REC B SEL. can be used to record any music sources, and SOURCE SEL. can be used to play any source independent from REC A SEL. and REC B SEL.

- **Roulette play**

If the ROULETTE key of amplifier A-7S is pressed, one component to be operated is selected from turntable P-7S, cassette deck X-7WS (Deck A and Deck B), and CD player DP-770, then one music to be played is selected by random access, and the musics will be played continuously.

About three seconds after one music is finished, the system select the next music source using the microcomputer in A-7S. The amplifier sends the data to the component selected according to the serial data (BUSY/DATA). The record player or cassette deck which has received the data selects the specified music by random access and starts to playing it.

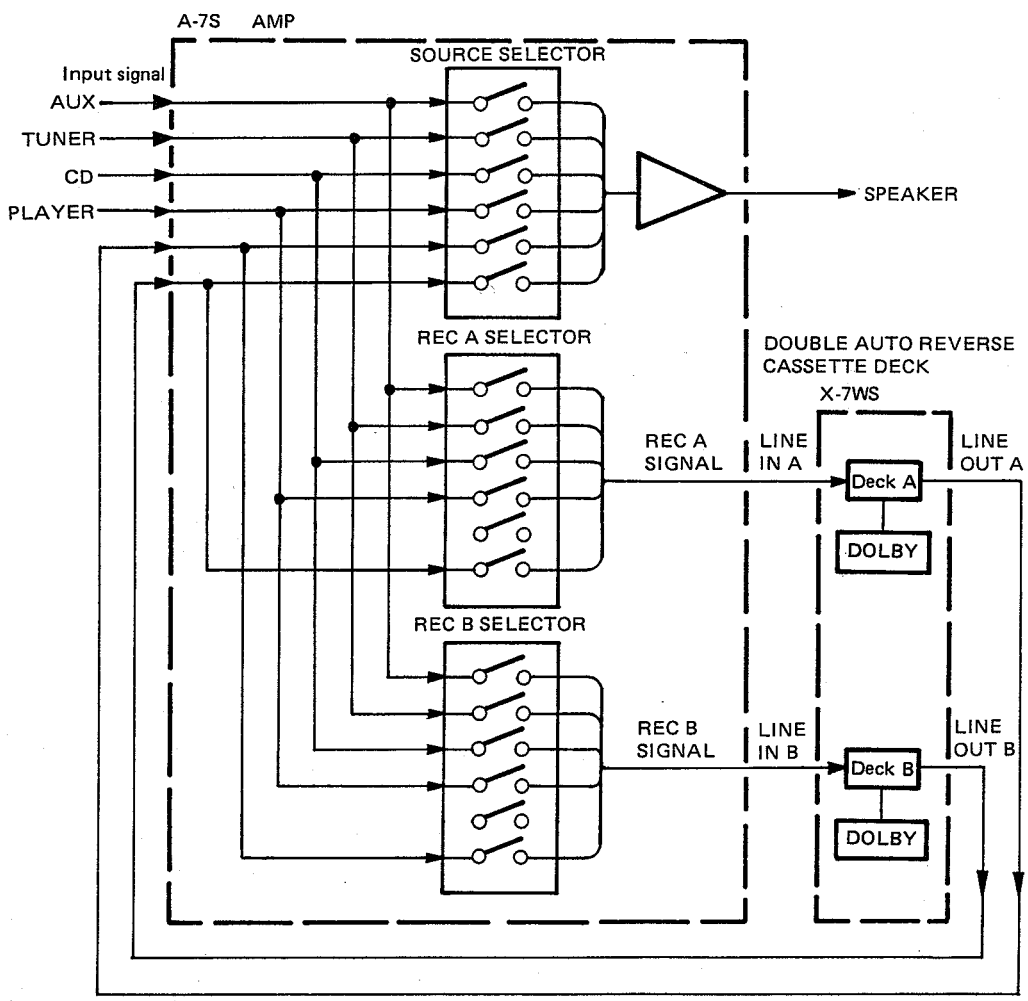


Fig. 1—4 IDRS outline

CIRCUIT DESCRIPTION

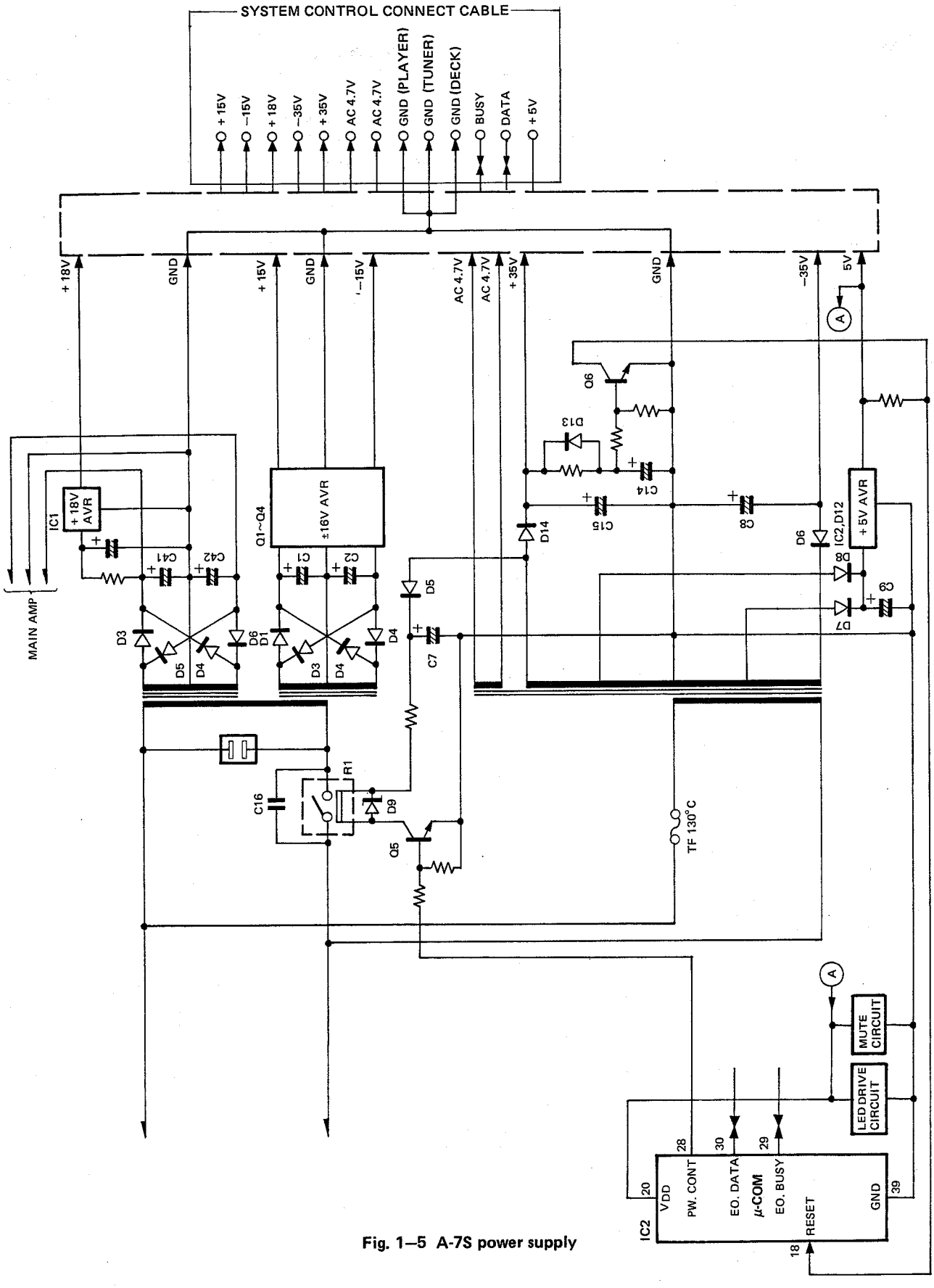


Fig. 1–5 A-7S power supply

CIRCUIT DESCRIPTION

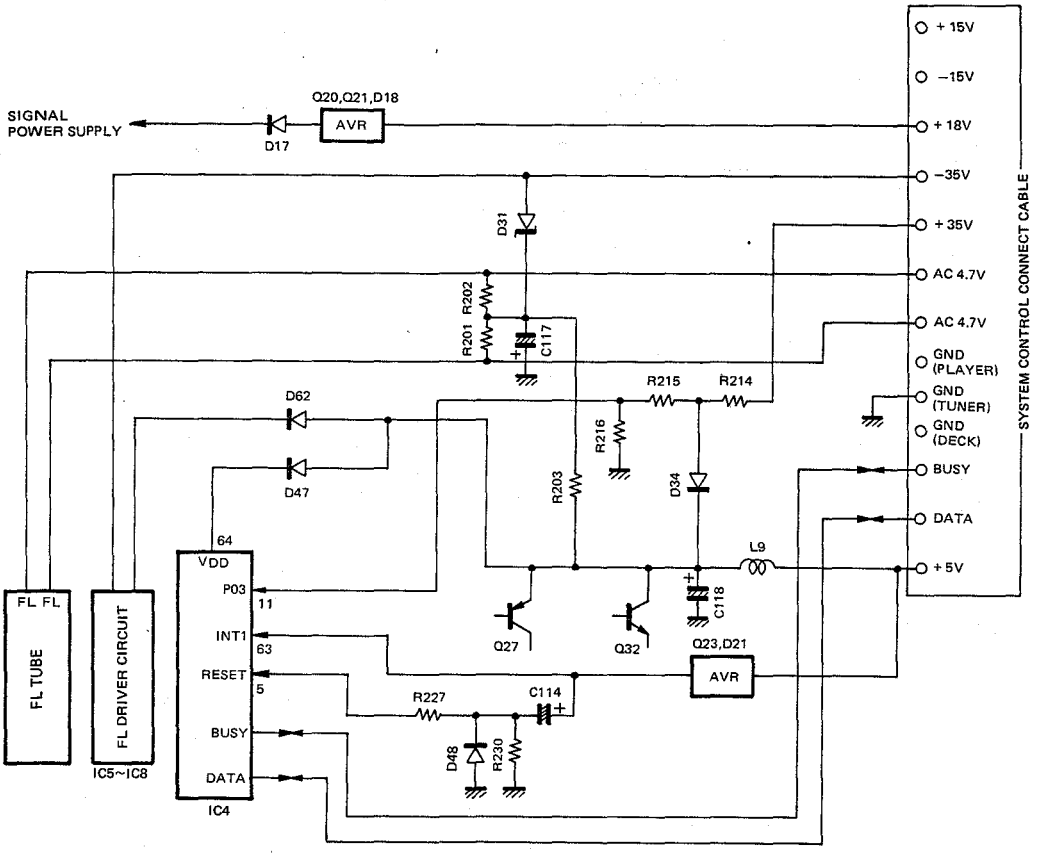


Fig. 1–6 T-3S/LS power supply

CIRCUIT DESCRIPTION

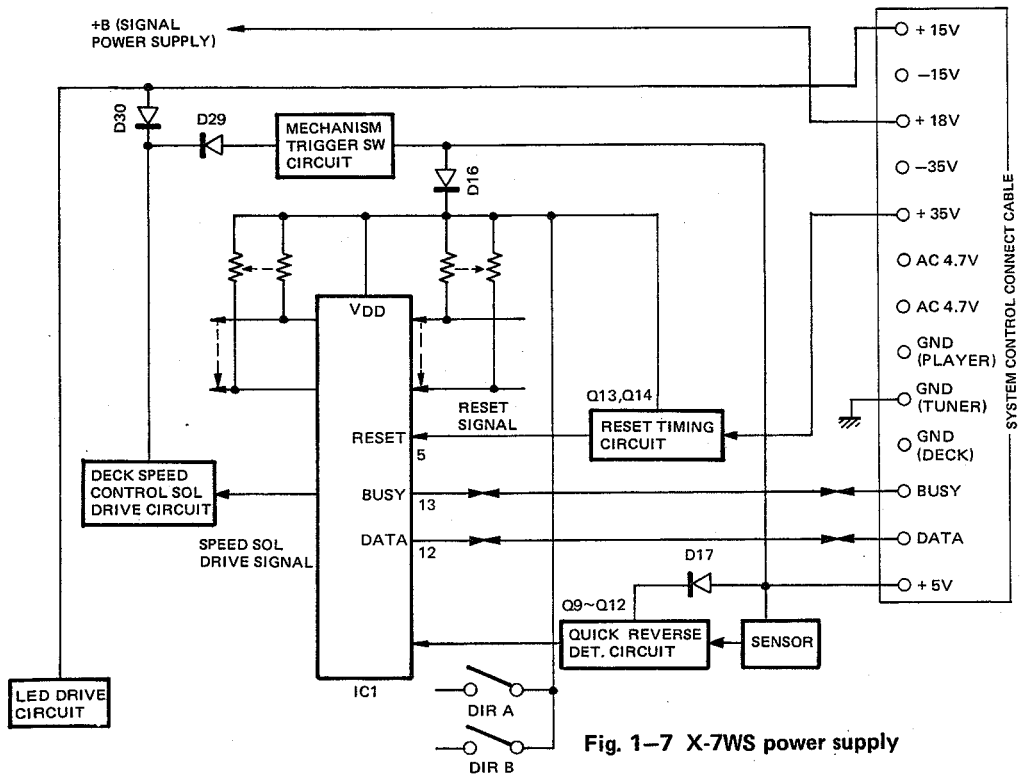


Fig. 1–7 X-7WS power supply

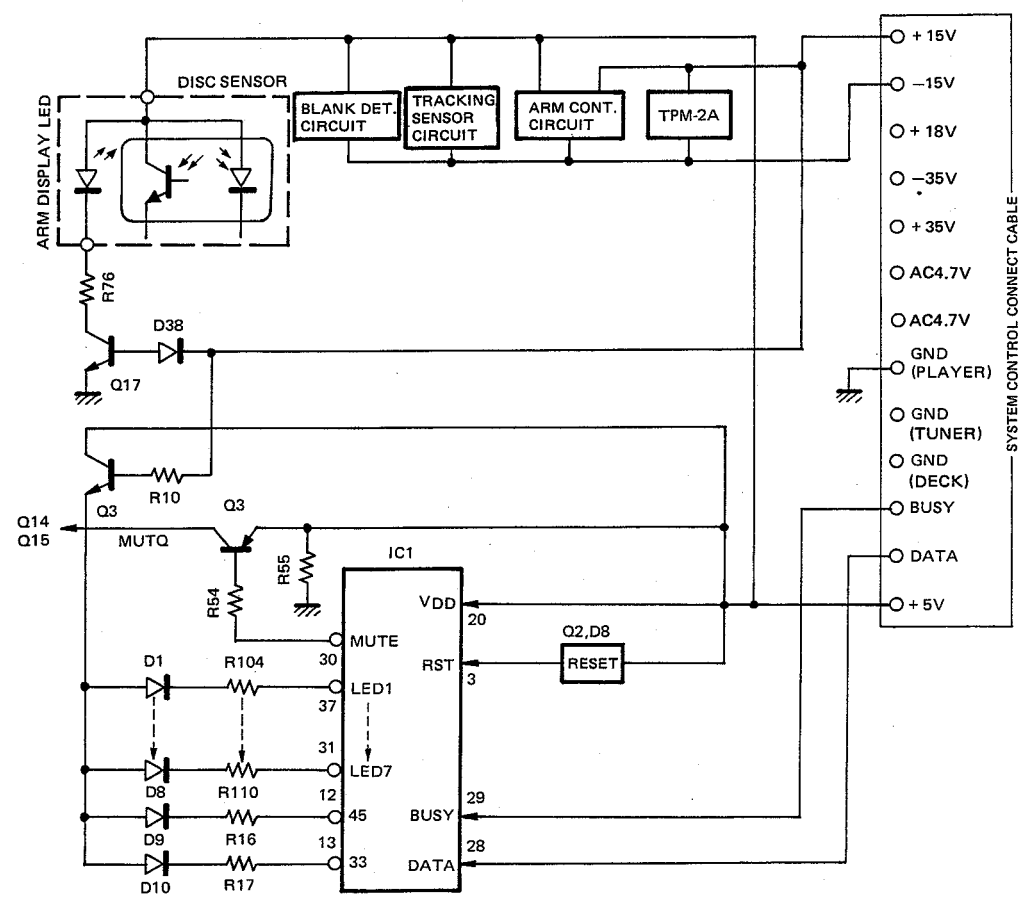


Fig. 1–8 P-7S power supply

CIRCUIT DESCRIPTION

2. Composition of synchro data

Each component outputs 8 bit data according to the output condition shown in the attached data. The first four of the eight bits are the code of each component, the second four are the function code which shows the condition of the component. Each code is output by LSB. (0 and 1 are distiguished from each other by the time of L level.) An example of the synchro data is shown below.

L M L M

0 1 0 0 1 0 1 0

That is,

0 0 1 0 0 1 0 1 B (B : Means binary notation)

=25H (H : Means hexadecimal notation)

⇨ System is turned on.

The meaning of each data is shown in Table 2–1.

BUSY indicates that the data line is being used at present. Only while this is at L level , it is possible to start outputting the data. If the outputting of data is started, this becomes H level. the communication is impossible, and the easy operation is impossbile consequently.

H of the threshold voltage of the microcomputer port is above 0.7VDD and below 0.3VDD.

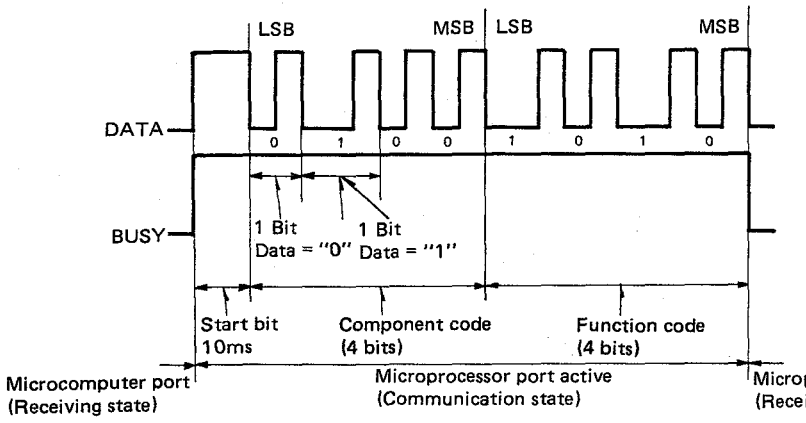


Fig. 2–1

Note)
MSB (Most Significant Bit) :
Most important column,
that is the highest column.
LSB (Least Significant Bit) :
Least important column,
that is the lowest column.

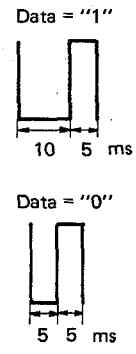


Fig. 2–2

Component code / Function code	AMP	TUNER	PLAYER	CD	DECK A	DECK B	REMOCON
	1	2	3	4	5	6	8,9,12,13
1	POWER ON	←	←	←	←	*	
2	TUNER	*	*	*	TUNER REC	←	
3	PHONO	*	*	*	PHONO REC	←	
4	CD	*	*	*	CD REC	←	
5	TAPE A	SYSTEM ON	*	*	TAPE A REC	←	
6	TAPE B	SYSTEM OFF	*	←	TAPE B REC	←	
7	AUX	CH UP/DOWN STOP	*	*	AUX REC	←	
8	ROULETTE ON	PLAY	←	←	←	←	
9	ROULETTE OFF	*	STOP	←	←	←	
A	*	*	MUTE ON	PAUSE	*	*	
B	*	*	MUTE OFF	*	*	*	
C	*	DUB	DUB 2	DUB	*	DUB	
D	*	*	DUB 1	*	*	*	
E	*	*	*	←	*	*	
F	*	*	PLAYER OFF	*	DECK OFF	*	

Table 2–1

* Unused

CIRCUIT DESCRIPTION

3. Operation of system

A system of MIDI series does not operated correctly, unless all of the amplifier, tuner, and cassette deck are prepared. If only the amplifier or the combination of amplifier and tuner are prepared, the power can be turned on (the power for signal system), but it cannot be turned off unless the power cable is not disconnected.

The following table shows the voltage at each terminal of the system control connecting cable and its purpose.

Mark ☆ shows what voltage and indication are supplied or given to each component when the power cable is connected to a wall outlet. (This operation is called System Operation I.)

Mark ★ shows what voltage and indication are supplied or given to each component when the power switch of the tuner is turned on. (This operation is called System Operation II.)

System control terminal		When power cable is connnected to outlet (☆) and when power switch of tuner is turned on (★)							
		A-7S		X-7WS		T-5S		P-7S	
Pin No.	Terminal voltage and signal name	Use	Indications	Use	Indications	Use	Indications	Use	Indications
1	+ 5V (μ-COM)	☆★	MODE IND. TAPE A/B REC : ON VOL. IND : "1" ON	☆★		☆ ★	FL : ON "00 : 00" blinking FL : Frequency indication	☆★	ARM DISPLAY IND. 33 rpm indication by :LED : ON (Illuminated)
2	DATA line								
3	BUSY line								
4	GND (DECK)								
5	GND (TUNER)								
6	GND (PLAYER)								
7	AC 4.7V (TUNER PL)					☆ ★	"00 : 00" blinking FL : Frequency indication		
8	AC 4.7V (TUNER FL)					☆ ★	"00 : 00" blinking FL : Frequency indication		
9	+ 35V (TUNER VCO)	☆★		☆★					
10	–35V (TUNER FL)								
11	+ 18V (DECK OUT)	★		★		★			
12	–15V (PLAYER MOTOR)	★							
13	+ 15V (Common power supply and PLAYER MOTOR)	★		★	DIRECTION LED : ON (Illuminated)			★	LED ON For control

Table 3–1

The contents of Table 3–1 are shown as System Operation I and II in Fig. 3–1.

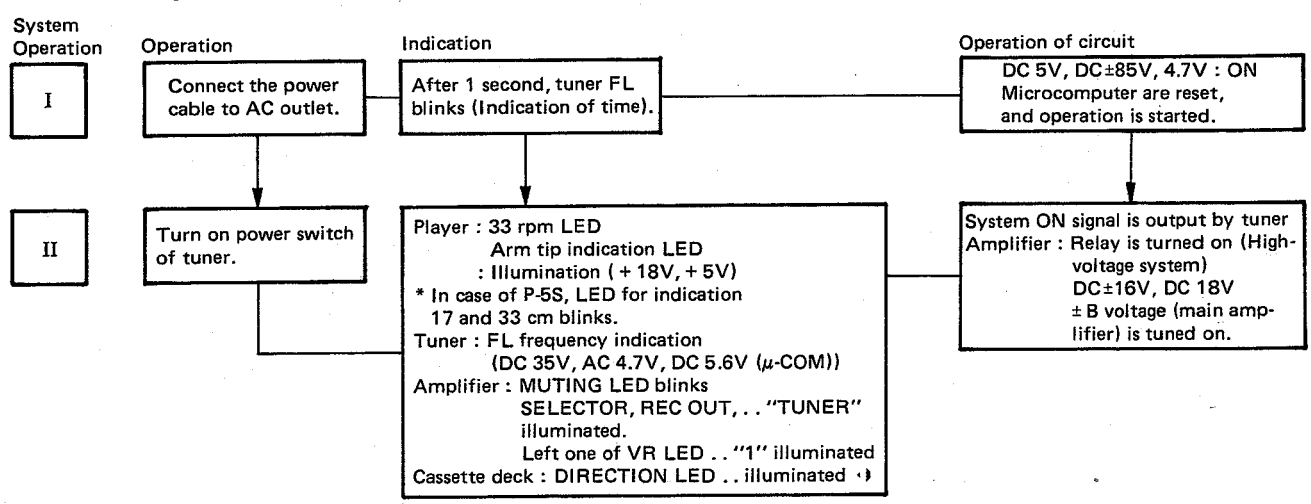

System Operation
Operation
Indication
Operation of circuit
I
Connect the power cable to AC outlet.
After 1 second, tuner FL blinks (Indication of time).
DC 5V, DC±85V, 4.7V : ON Microcomputer are reset, and operation is started.
II
Turn on power switch of tuner.
Player : 33 rpm LED
Arm tip indication LED
: Illumination (+ 18V, + 5V)
* In case of P-5S, LED for indication 17 and 33 cm blinks.
Tuner : FL frequency indication
(DC 35V, AC 4.7V, DC 5.6V (μ-COM))
Amplifier : MUTING LED blinks
SELECTOR, REC OUT, . . "TUNER" illuminated.
Left one of VR LED . . "1" illuminated
Cassette deck : DIRECTION LED . . illuminated
System ON signal is output by tuner
Amplifier : Relay is turned on (High-voltage system)
DC±16V, DC 18V
± B voltage (main amplifier) is tuned on.

Fig. 3–1

Note : The tuner keeps the music selection memory and ON/OFF condition of the power (for about three days) after the power cable is disconnected. Therefore, when the power cable is connected to an AC outlet again, if the former conditions are still stored, the system start System Operation II immediately.

CIRCUIT DESCRIPTION

- **System operation I**

If the power cable is connected to an AC outlet, the power supply unit of amplifier is turned on, and the voltages of DC 5.6V, DC±35V, and AC 4.7V are supplied to the components. At this time, the microprocessor of each component is reset, then it starts the operation. FL of the tuner blinks to indicate the time, but the indicators of other components are not illuminated. The transfer of data among μ-COM's of the components for this operation is shown in Fig. 3–2.

- **System operation II**

If the power switch of the tuner is turned on, the tuner indicates the frequency instead of the time, and outputs the system ON signal "25H" to each component. On reception of this signal, the amplifier turns on the relay for controlling the high-voltage system, and illuminates the indicators of the selector, REC OUT, and VR position, then the LED of MUTING blinks. At this time, the key operation is permitted. LED of DIRECTION is turned on when DC±15V is applied. LED of 33rpm on the record player is turned on when DC±16V is applied, then its microprocessor starts to accept the key operation.

The transfer of data among μ-COM's of the components for this operation is shown in Fig. 3–3.

Transfer of data among μ-COM's through BUSY/DATA signal line for initial setting

(Processing by each μ-COM)

Step 1
Each μ-COM receives the reset signal, then it performs the initial resetting. μ-COM of the cassette deck outputs "Deck Power ON".

Step 2
On reception of data "Deck Power ON", outputs data "Arm Power ON".

Step 3
Receives data "Arm Power ON".
Outputs the operating condition of cassette deck.
Outputs the following data.
"Deck (A) Stop"
"Deck (B) Stop"

Step 4
On reception of reset signal, waits for about 1 second.
Then, outputs data "System Power OFF".

Step 5
Receives data "System Power OFF".
Outputs data "Deck Power OFF".

Step 6
Receives data "System Power OFF".
Outputs data "Player Power OFF".

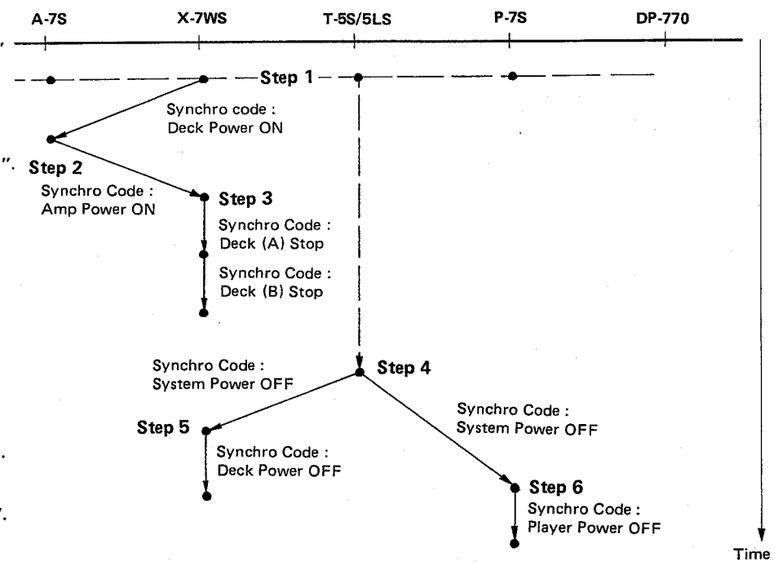


Fig. 3–2 System operation I

CIRCUIT DESCRIPTION

Transfer of data among μ-COM through BUSY/DATA line when system is turned on by tuner

(Processing by each μ-COM)

Step 1
Detects the turning-on of the power switch.
Output data "System Power ON".

Step 2
On reception of the above data, turns on the relay.
(Starts to supply the power to signal system.)
Outputs data "Amp Sel. Tuner".

Step 3
Receives data "System Power ON".
Waits for data "Power ON" from each component.

Step 4
AC 100V is supplied to PT when the relay of AMP. is turned on.
Power supply is stabilised. Outputs data "CD Power ON".

Step 5
On reception of data "System Power ON", returns the arm to the resting position.
Outputs data "Player Power ON".

Step 6
On reception of data "Player Power ON" or "CD Power ON", outputs the following data.
"Deck (A) Stop" "Deck (B) Stop"

Step 7
Receives data "Deck (B) Stop".
Each component memorize the conditon of cassette deck, and starts the system operation.

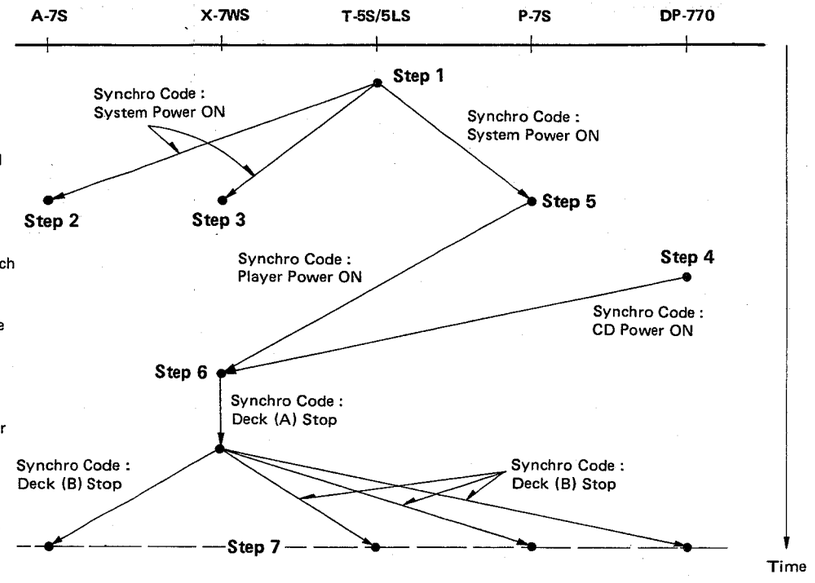


Fig. 3–3 System operation II when power ON

Transfer of data among μ-COM through BUSY/DATA line when system is turned off

(Processing by each μ-COM)

Step 1
Detects the turn-off of the Power switch.
Outputs data "System Power OFF".

Step 2
Receives data "System Power OFF".
Turns off the indicator system of amplifier and waits for the following data.
"Deck Power OFF"
"Player Power OFF"

Step 3
Receives data "System Power OFF".
Stops the cassette deck, and sets it to the power failure state.
Outputs data "Deck Power OFF".

Step 4
Receives data "System Power OFF".
Sets the record player to the power failure state.
Outputs data "Player Power OFF".

Step 5
Receives the following two data.
"Deck Power OFF".
"Player Power OFF"
Turns off the relay to cut off the power for the signal system.

Step 6
The relay of the amplifier is turned off, and the AC power supply for the CD player is cut off.

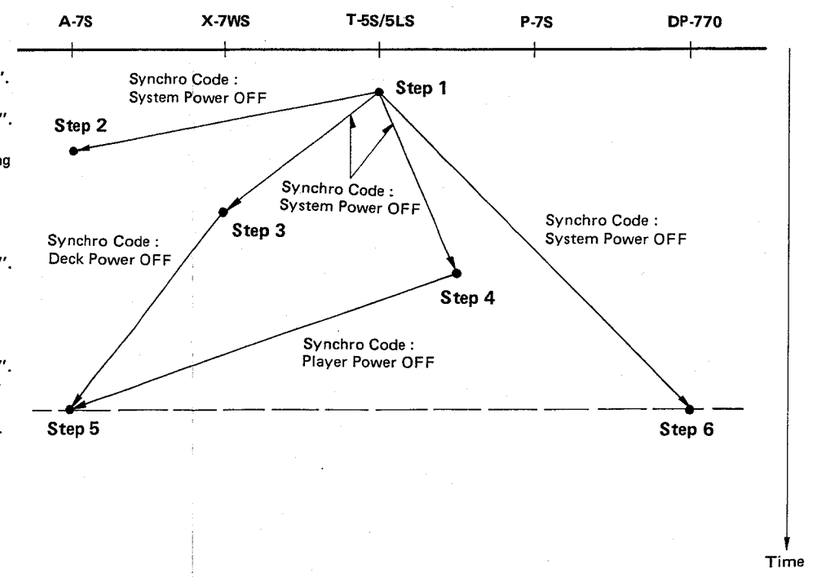


Fig. 3–4 System operation II when power OFF

CIRCUIT DESCRIPTION

4. Troubleshooting the system

The components of MIDI series are designed so that they will be repaired as a system. If any abnormality is found in the operation of the system, confirm the following.

Examples of troubles : The power is not supplied when the power switch of the tuner is pressed.
The easy operation is not started.

- **Check of connecting cable**

Confirm that the system control connecting cable and pin cables (including the GND cable) are connected securely to each component. Check the cables and connectors for bad contact and breakage.

- **Check of power supply for amplifier**

The amplifier supplies the power to all the other components. Disconnect the system control connecting cable (Keep the pin cables connected), and confirm that the power supply circuit of the amplifier itself is normal.

Since the power switch is installed to only the tuner, the amplifier cannot be turned on by itself, if the system control connecting cable. However, when servicing the amplifier, it can be turned on by itself by performing the following special operation.

How to turn on the amplifier when the tuner (power switch) is not connected

Press the four keys of TUNER, CD, PHONO, and MUTING. (4-key pressing of amplifier)

- **Check of each component**

If the system control connecting cable and the power supply for the amplifier are normal, the power must be supplied to the system control connecting terminals of each component. In this case, one of following three items in each component is possibly the cause of the trouble, thus check them.

1 Power supply for microcomputer (DC 5.0V)
2 Microcomputer
3 Outside circuit and pattern

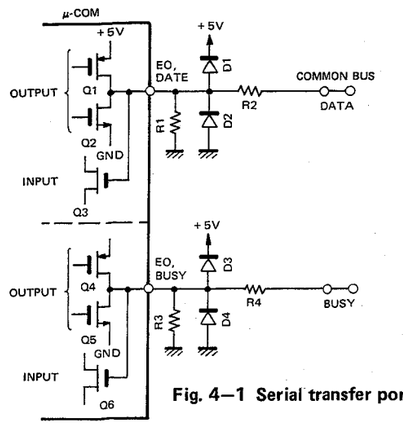


Fig. 4—1 Serial transfer port details

- **How to find the trouble component**

By operating the components one by one and observing their indication and operation, the troubled one may be found. The following are the examples of how to find the troubled one.

Example 1 : F1 of the tuner does not indicate any thing when the AC power cable is connected to an AC outlet.

Note : F1 of the tuner is not illuminated, if any one of −35V, AC 4.7V, and DC 5V fails.

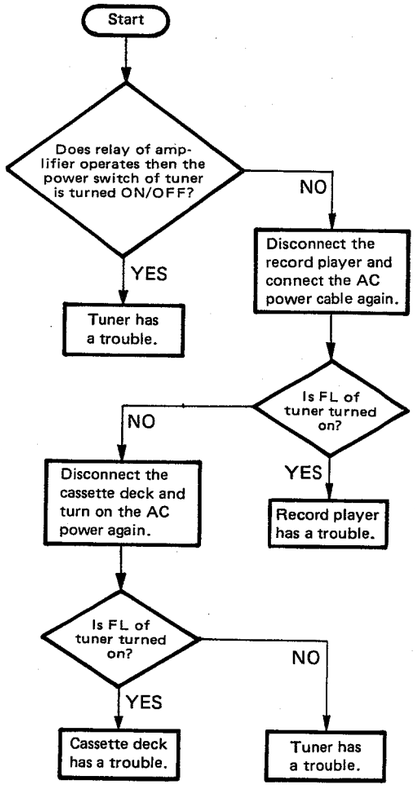

Start
Does relay of amplifier operates then the power switch of tuner is turned ON/OFF?
NO
YES
Disconnect the record player and connect the AC power cable again.
Tuner has a trouble.
Is FL of tuner turned on?
NO
YES
Disconnect the cassette deck and turn on the AC power again.
Record player has a trouble.
Is FL of tuner turned on?
NO
YES
Cassette deck has a trouble.
Tuner has a trouble.

Fig. 4—2

A-7S A-7S

CIRCUIT DESCRIPTION

The tuner FL goes on and off after AC power is supplied. Even if you push the POWER SW, the indicators for other components will not light up because the relay in the amplifier is not turned on.

The fact that the tuner FL goes on and off means that the circuits to other components at −35V, AC 4.7V and DC 5.0V might be open but never be shortcircuited.

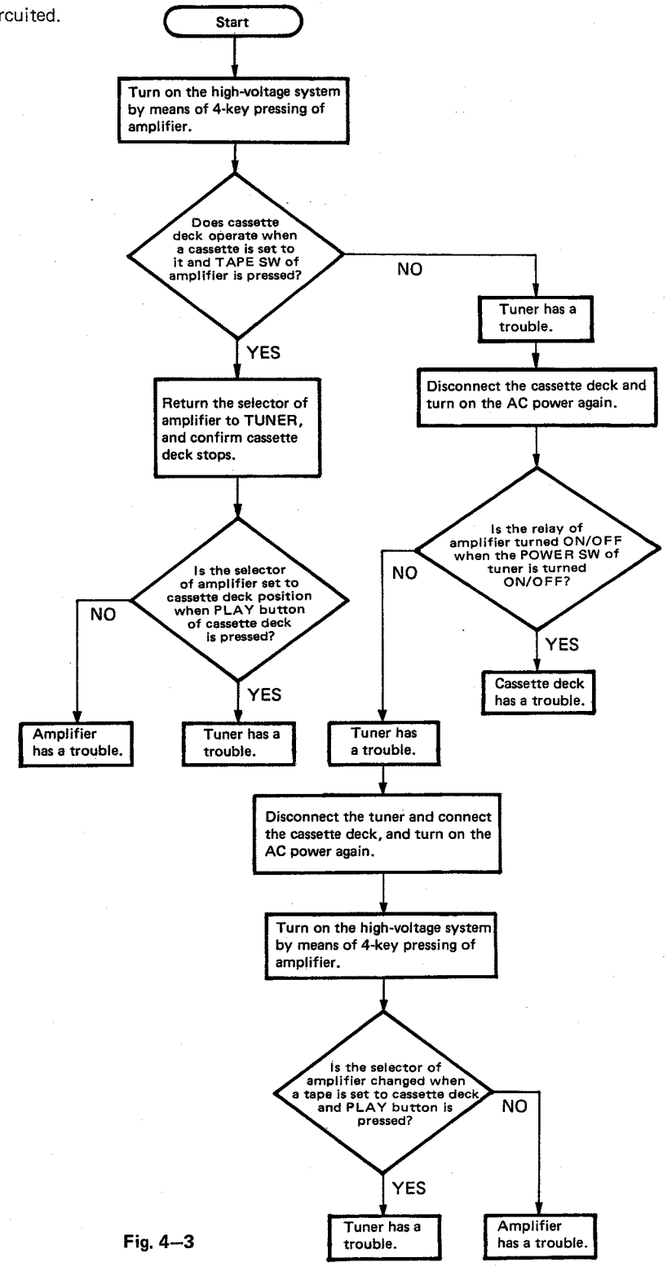

Start
Turn on the high-voltage system by means of 4-key pressing of amplifier.
Does cassette deck operate when a cassette is set to it and TAPE SW of amplifier is pressed?
NO
YES
Tuner has a trouble.
Disconnect the cassette deck and turn on the AC power again.
Return the selector of amplifier to TUNER, and confirm cassette deck stops.
Is the relay of amplifier turned ON/OFF when the POWER SW of tuner is turned ON/OFF?
NO
YES
Cassette deck has a trouble.
Is the selector of amplifier set to cassette deck position when PLAY button of cassette deck is pressed?
NO
YES
Amplifier has a trouble.
Tuner has a trouble.
Tuner has a trouble.
Disconnect the tuner and connect the cassette deck, and turn on the AC power again.
Turn on the high-voltage system by means of 4-key pressing of amplifier.
Is the selector of amplifier changed when a tape is set to cassette deck, and PLAY button is pressed?
NO
YES
Tuner has a trouble.
Amplifier has a trouble.

Fig. 4—3

CIRCUIT DESCRIPTION

In the case where the system does not contain a turntable (i.e., composed of an amplifier, tuner and cassette deck player) and other conditions are the same as the Ex. 2 before.

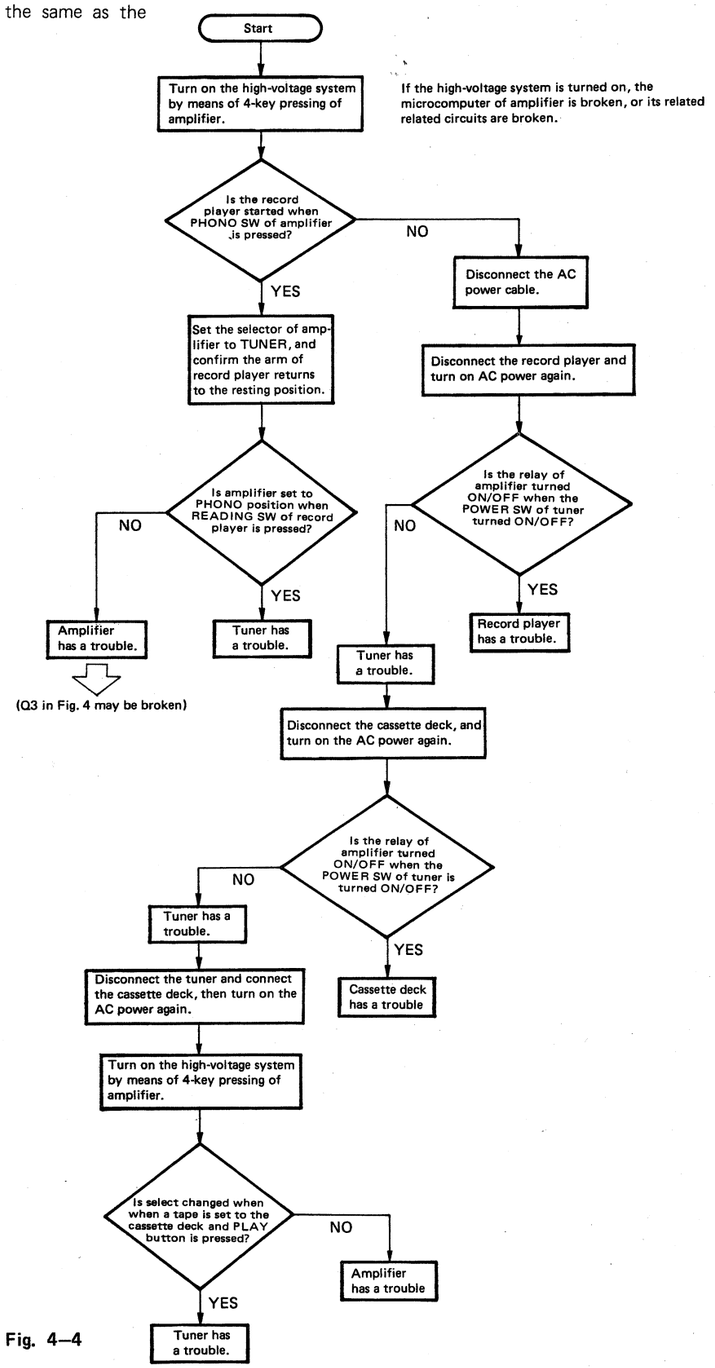

Start
Turn on the high-voltage system by means of 4-key pressing of amplifier.
If the high-voltage system is turned on, the microcomputer of amplifier is broken, or its related related circuits are broken.
Is the record player started when PHONO SW of amplifier is pressed?
NO
YES
Disconnect the AC power cable.
Set the selector of amplifier to TUNER, and confirm the arm of record player returns to the resting position.
Disconnect the record player and turn on AC power again.
Is amplifier set to PHONO position when READING SW of record player is pressed?
NO
YES
Is the relay of amplifier turned ON/OFF when the POWER SW of tuner turned ON/OFF?
NO
YES
Amplifier has a trouble.
(Q3 in Fig. 4 may be broken)
Tuner has a trouble.
Tuner has a trouble.
Record player has a trouble.
Disconnect the cassette deck, and turn on the AC power again.
Is the relay of amplifier turned ON/OFF when the POWER SW of tuner is turned ON/OFF?
NO
YES
Tuner has a trouble.
Cassette deck has a trouble
Disconnect the tuner and connect the cassette deck, then turn on the AC power again.
Turn on the high-voltage system by means of 4-key pressing of amplifier.
Is select changed when when a tape is set to the cassette deck and PLAY button is pressed?
NO
YES
Amplifier has a trouble
Tuner has a trouble.

Fig. 4–4

ADJUSTMENT/REGLAGE/ABGLEICH

ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
Set the controls and switches as follows: POWER: ON							
1	IDLE CURRENT	–	Connect a DC voltmeter across CP1 (L) CP2 (R)	VOLUME: 0	* R39,41 (L) R40,42 (R)	5mV～40mV	(a)

*If meter reads is high, cut resistor R41(R42)
If meter reads is low, cut resistor R39(R40)

REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINS L'ALIGNEMENT	ALIGNER POUR	FIG.
Régler les controles et les boutons comme suit: POWER: ON							
1	COURANT DE POLARISATION	–	Connecter un voltmètre de CC sur CP1 (G) CP2 (D)	VOLUME: 0	R39,41 (G) R40,42 (D)	5mV～40mV	(a)

ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VORSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
Die Regler und Knöpfe wird folgt einstellen: POWER: ON							
1	LEERLAUFSTROM	–	Einen Gleichspannungs-messer über CP1 (L) CP2 (R) anschließen.	VOLUME: 0	R39,41 (L) R40,42 (R)	5mV～40mV	(a)

ADJUSTMENT/REGLAGE/ABGLEICH

ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
Set the controls and switches as follows: POWER: ON							
1	IDLE CURRENT	–	Connect a DC voltmeter across CP1 (L) CP2 (R)	VOLUME: 0	* R39,41 (L) R40,42 (R)	5mV~40mV	(a)

*If meter reads is high, cut resistor R41(R42)
If meter reads is low, cut resistor R39(R40)

REGLAGE

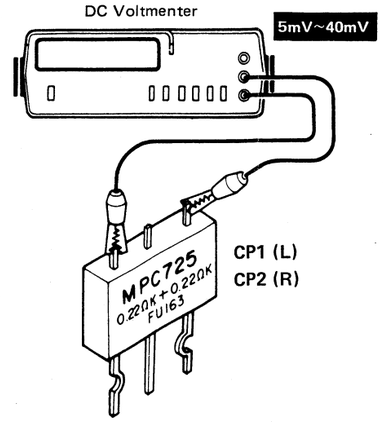
N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLIFICATEUR	POINS L'ALIGNEMENT	ALIGNER POUR	FIG.
Régler les controles et les boutons comme suit: POWER: ON							
1	COURANT DE POLARISATION	–	Connecter un voltmètre de CC sur CP1 (G) CP2 (D)	VOLUME: 0	R39,41 (G) R40,42 (D)	5mV~40mV	(a)

ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	VORSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
Die Regler und Knöpfe wird folgt einstellen: POWER: ON							
1	LEERLAUFSTROM	–	Einen Gleichspannungs-messer über CP1 (L) CP2 (R) anschließen.	VOLUME: 0	R39,41 (L) R40,42 (R)	5mV~40mV	(a)

A-7S

ADJUSTMENT/REGLAGE/ABGLEICH



(a)

A-7S A-7S

PC BOARD

X00-2362-71

	B	C	E
Q1	16.4V (0V)	27.3V (0V)	15.8V (0V)
Q2	28.0V (0V)	–17.0V (0V)	–27.4V (0V)
Q3	17.0V (0V)	27.3V (0V)	16.4V (0V)
Q4	–7.6V (0V)	–28.0V (0V)	–17.0V (0V)
Q5	0.8V (0V)	0.7V (54.7V)	0V
Q6	AC outlet ON / OFF, 5.7V, (Collector), 40ms		

IC1

1	33.4V (0V)
2	0V
3	17.8V (0V)

IC2

1	12.5V (13.0V)
2	–
3	5.7V (5.7V)

( ) : System power OFF

X11-2180-00

IC1

1	–13.3V
16	12.3V

IC2

1	0V
2	0V
3	0V
4	–13.3V
5	0V
6	0V
7	0V
8	12.3V

X13-5050-13

IC1

10	–13.3V
19	12.2V

X13-5192-71

	Q1~Q12
B	–1.0V
C	12.2V
E	–1.6V

X09-2202-71

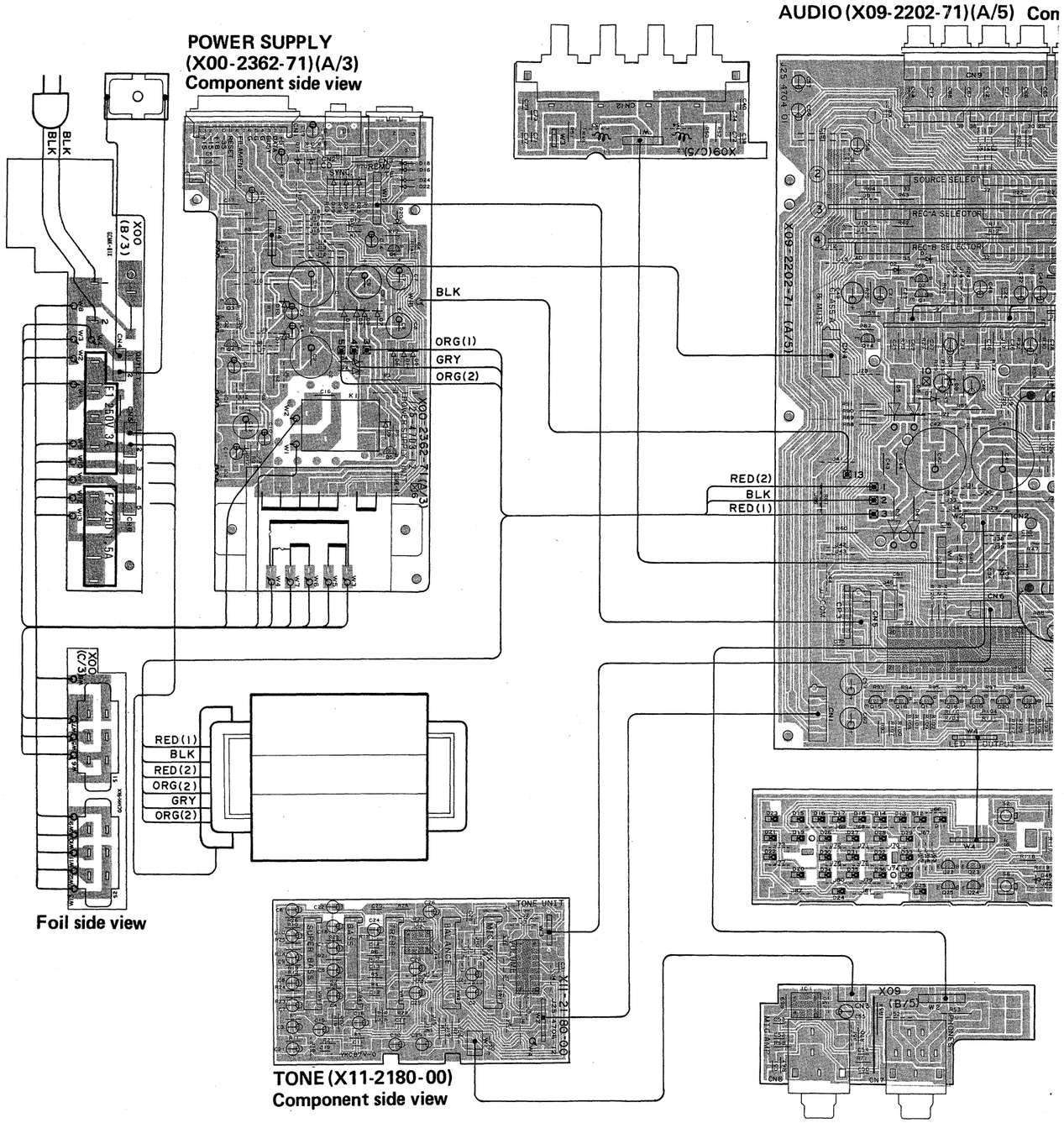
	B	C	E
Q1,Q2	0.1V, Muting ON : 0.65V	0V	–
Q3,Q4	–0.5V	1.2V	–1.2V
Q5,Q6	1.2V	42.8V	0.6V
Q7,Q8	–1.2V	–42.7V	–0.6V
Q9,Q10	0.6V	42.8V	0V
Q11,Q12	–0.6V	–42.7V	0V
Q13	33.6V	42.8V	32.6V
Q14	–	–0.1V, Muting ON : 5.7V	5.7V
Q15~Q21	(5.5V) 5.7V, 2ms	(2.0V) 5.7V, 2ms	5.7V
Q22~Q25	(0.15V) 0.6V, 2ms	(0.1V) 0.8V, 2ms	0V
	ON time : 2ms, OFF time : 6ms Duty 1/4		

( ) : Ref. Value

IC1

1	0V
2	0V
3	0V
4	–13.4V
5	0V
6	0V
7	0V
8	12.2V

POWER SUPPLY (X00-2362-71)(A/3) Component side view



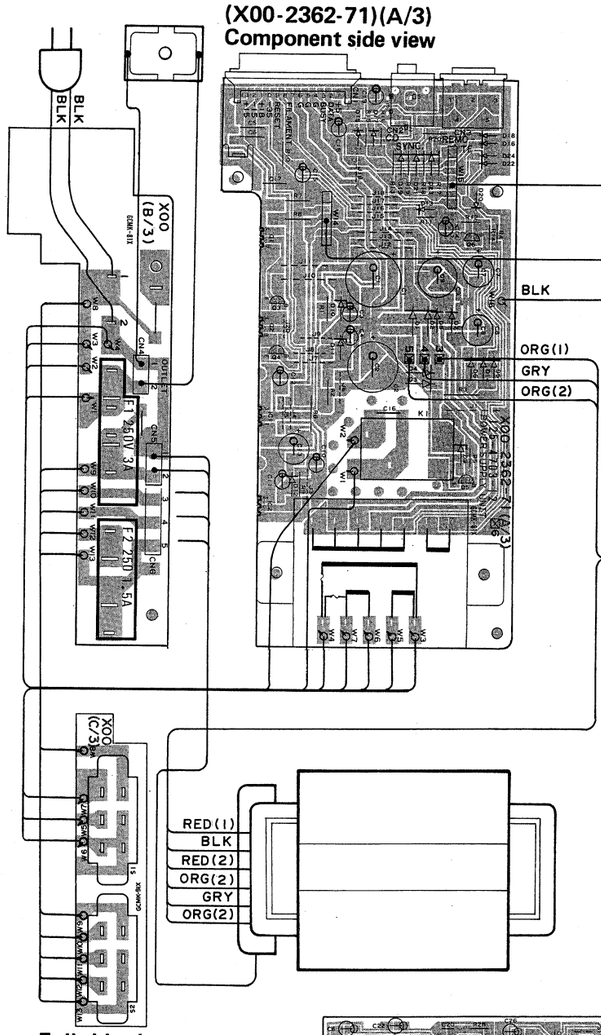
Foil side view

AUDIO (X09-2202-71)(A/5) Con

TONE (X11-2180-00) Component side view

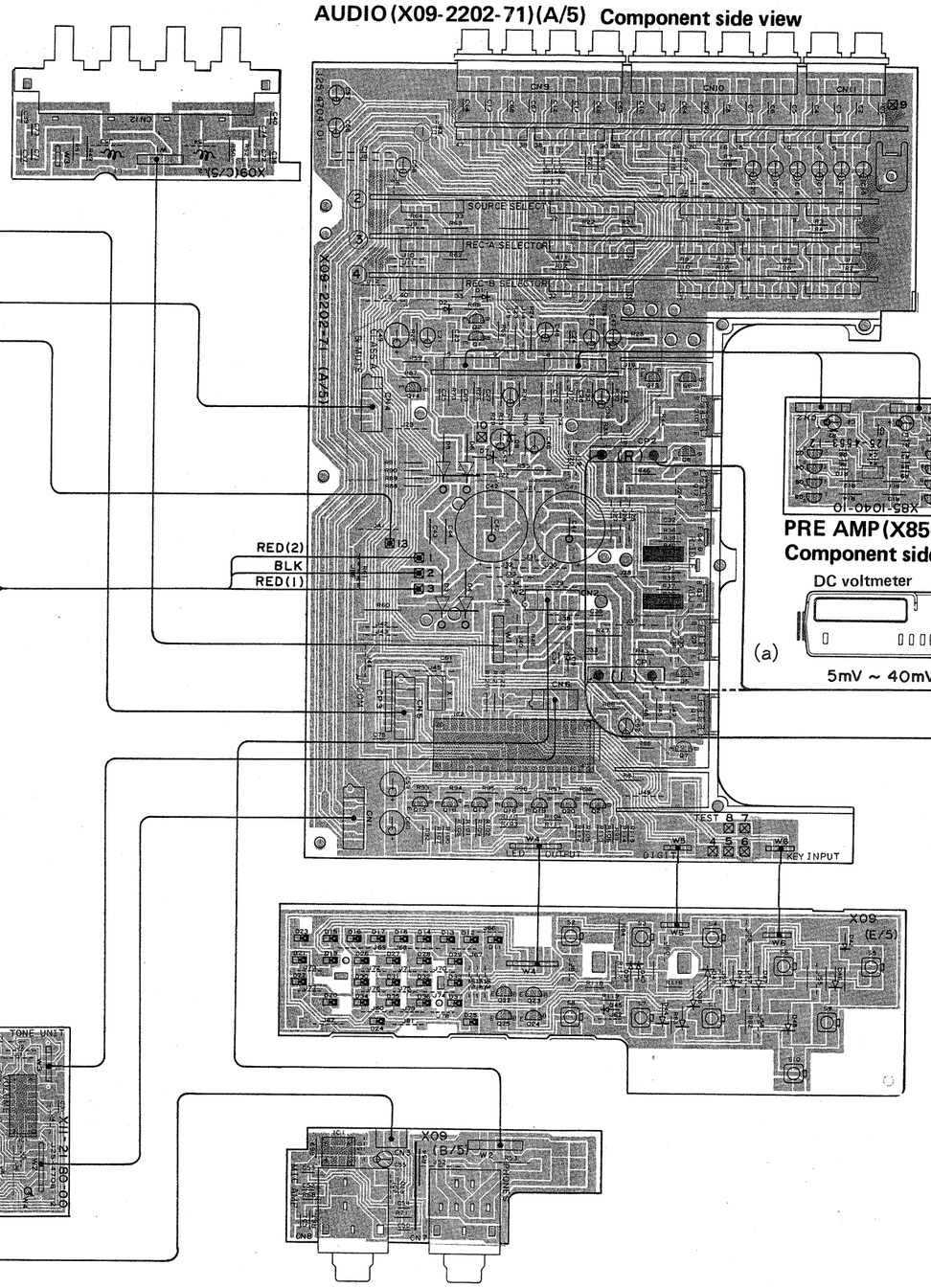
PC BOARD

POWER SUPPLY
(X00-2362-71)(A/3)
Component side view

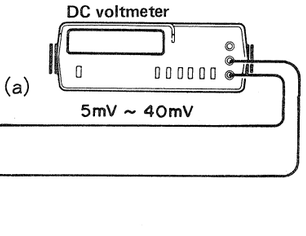


Foil side view

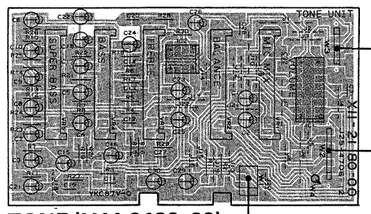
AUDIO (X09-2202-71)(A/5) Component side view



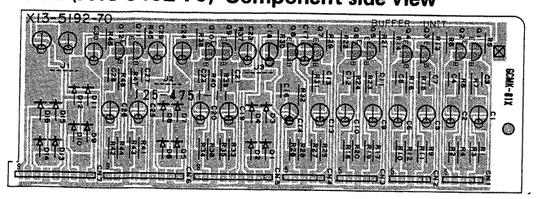
PRE AMP (X85-1040-10)
Component side view



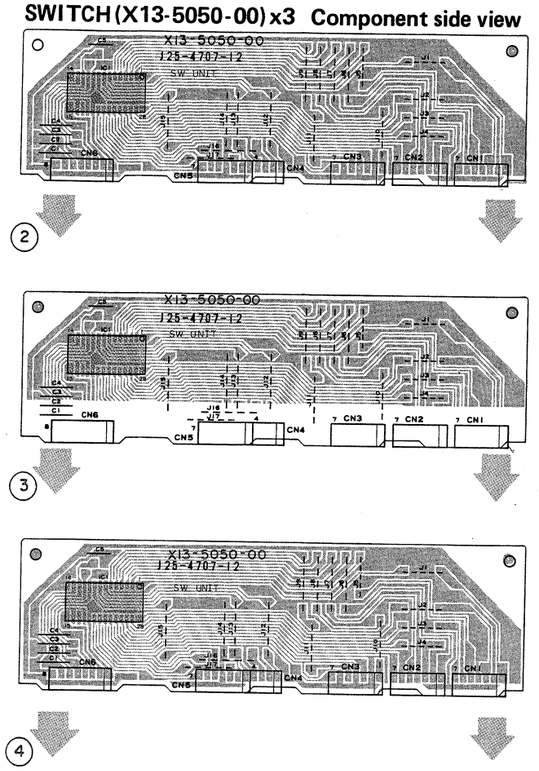
TONE (X11-2180-00)
Component side view



SUB (X13-5192-70) Component side view

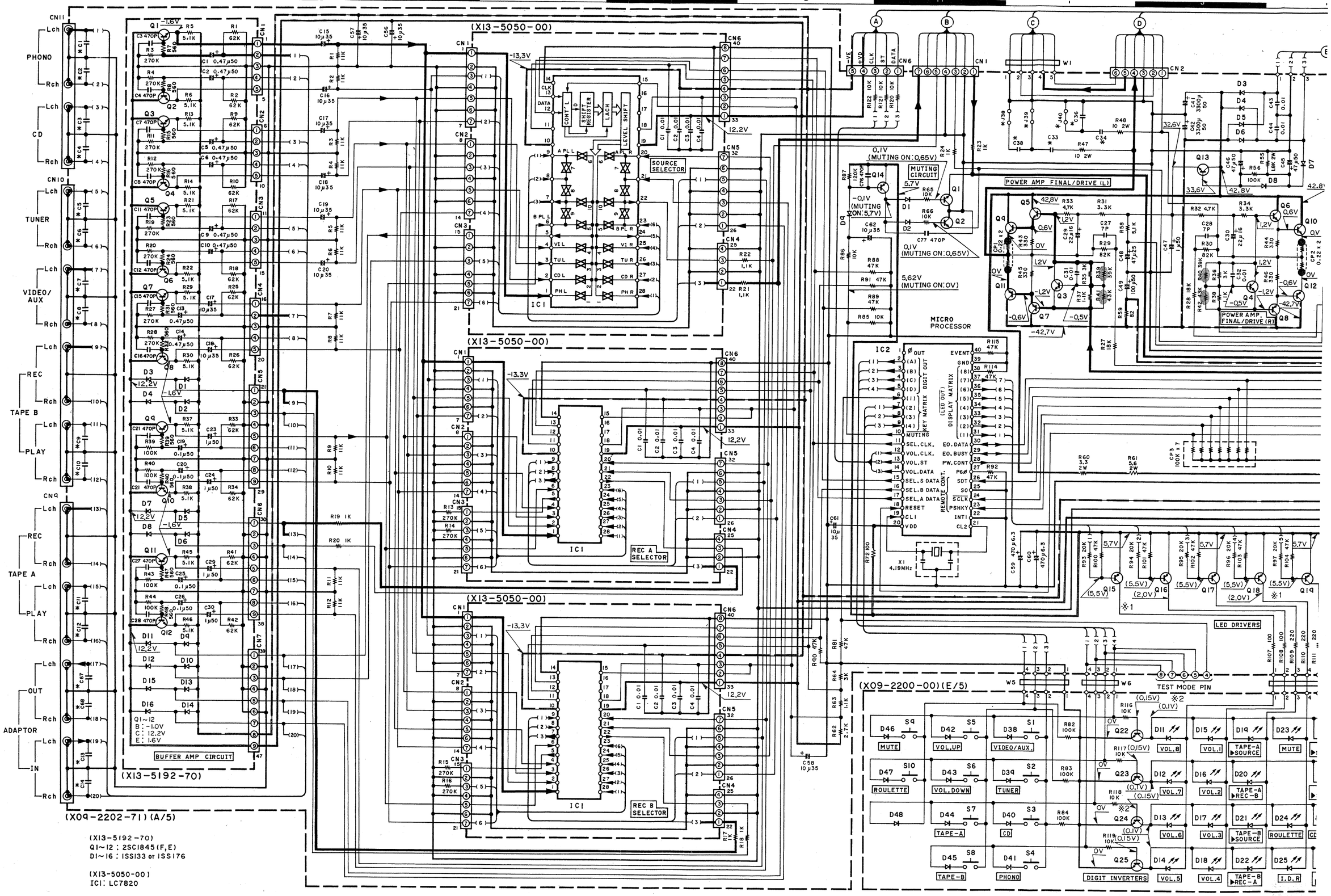


SWITCH (X13-5050-00) x3 Component side view



Front

Refer to the schematic diagram for the values of resistors and capacitors.


(X13-5050-00)
(X13-5192-70)
(X09-2202-71)(A/5)
(X09-2200-00)(E/5)
BUFFER AMP CIRCUIT
SOURCE SELECTOR
REC A SELECTOR
REC B SELECTOR
MUTING CIRCUIT
MICRO PROCESSOR
POWER AMP FINAL/DRIVE (L)
POWER AMP. FINAL/DRIVE (R)
LED DRIVERS
TEST MODE PIN
PHONO
CD
TUNER
VIDEO/AUX
REC
TAPE B
PLAY
TAPE A
OUT
ADAPTOR
IN
(X13-5192-70)
Q1~12 : 2SC1845(F,E)
D1~16 : ISS133 or ISS176
(X13-5050-00)
IC1: LC7820

✱(X09-)		○:USED, X:NOT USED				
TYPE	C1~14,67,68		C33,34		C35,36	
E	150P		0.1		0.1	
M,T	X		0.047		X	
TYPE	C37~40	C50	C53	R68	J38	J39,40
E	0.01	560P	2200P	1K	○	X
M,T	X	X	560	100	X	○

(X85-1040-10)

Q1~4 : 2SA992(F,E)
Q5~8 : 2SC1845(F,E)

Voltage in changed by lighted LEDs.

✱1. Q15~Q21
( ):Ref. value

(X09-2202-71)(C/5)

(X09-2202-71)(B/5)

(X11-2180-00)

(X00-2362-71)(A/3)

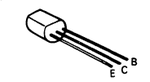
(X11-2180-00)
IC1 : TC9176P
IC2 : μPC4570C or NJM2068D-D

(X00-2362-71)
IC1 : TA78018AP
IC2 : TA78005AP*1 or AN7805*1 or μPC7805*1

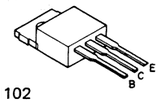
Q1,2 : 2SC2167
Q3,6 : 2SC945(A)(Q,P) or 2SC1685(R,S)
Q4 : 2SA733(A)(Q,P) or 2SA1127NC(R,S)
Q5 : 2SC2003(L,K)
D1~8,14 : DSM1A1
D9 : RD24F(B)
D10,11 : RD16E(B)
D12,13,15~24 : 1SS133

(X09-2202-71)
IC1 : AN6556
IC2 : μPD7508HC-049
Q1,2 : 2SD1302(S)
Q3,4 : 2SC945(A)(Q)
Q5,6 : 2SC3244(D,E)
Q7,8 : 2SA1284(D,E)
Q9,10 : 2SC2577
Q11,12 : 2SA1102
Q13 : 2SC945(A)(Q,P) or 2SC1685(R,S)
Q14~21 : 2SA733(A)(Q,P) or 2SA1127NC(R,S)
Q22~25 : 2SC2003(L,K)
D1,2,9,38~48 : 1SS133
D3~6 : GP20DL
D7 : DSM1A1
D8 : 1S2076A
D11~18 : B30-0432-05(GRN)
D19~37 : B30-0431-05(RED)

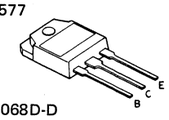
2SA1127NC 2SC1845
2SA1284 2SC2003
2SA733(A) 2SC3244
2SA992 2SC945(A)
2SC1685 2SD1302



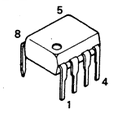
2SC2167



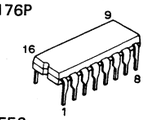
2SA1102
2SC2577



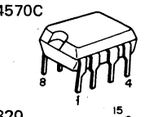
NJM2068D-D



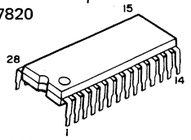
TC9176P



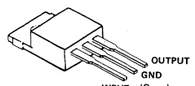
AN6556
μPC4570C



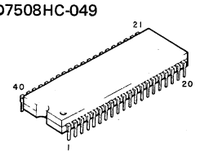
LC7820



AN7805*1
TA78005AP*1
TA78018AP
μPC7805H*1



μPD7508HC-049



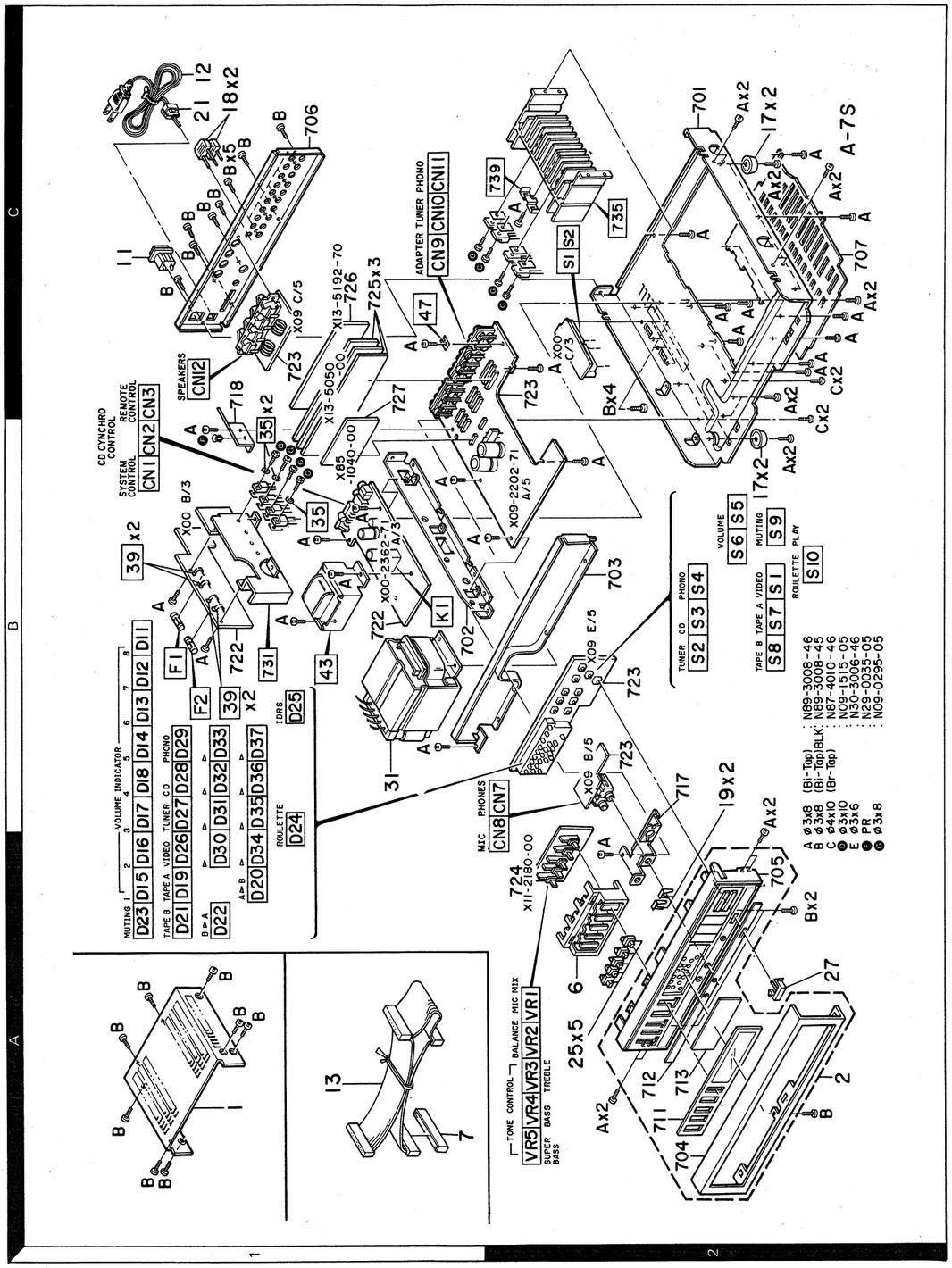
CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

- DC voltages are as measured with a high impedance voltmeter with no signal input. Values may vary slightly due to variations between individual instruments or/and units.

A-7S

KENWOOD

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
				A-7S			
	1	1A	*	A01-1441-01	METALLIC CABINET		
	2	2A	*	A20-4723-02	PANEL ASSY	UMUEE	
	2	2A	*	A20-4724-02	PANEL ASSY	T	
	6	2A	*	B07-1416-02	ESCUTCHEON (TONE,BAL,MIC)		
	7	1A	*	B09-0055-05	CAP		
	-			B46-0094-03	WARRANTY CARD	UUE	
	-			B46-0095-03	WARRANTY CARD	UUE	
	-			B46-0122-13	WARRANTY CARD	E	
	-			B46-0123-03	WARRANTY CARD	T	
	-		*	B50-5893-00	INSTRUCTION MANUAL(ENGLISH)	UMUEE	
	-		*	B50-5894-00	INSTRUCTION MANUAL(FRENCH)	ME	
	-		*	B50-5895-00	INSTRUCTION MANUAL(SPANISH)	M	
	-		*	B50-5896-00	INSTRUCTION MANUAL(ARABIC)	M	
	-		*	B50-5897-00	INSTRUCTION MANUAL(ENGLISH)	T	
	-		*	B50-5898-00	INSTRUCTION MANUAL(G,D,I)	E	
	-			B58-0222-14	CAUTION CARD (PRE-SET 220V)	UE	
	-			B58-0223-04	CAUTION CARD (PRE-SET 120V)	U	
	-			B58-0245-33	CAUTION CARD (FTZ)	E	
	-		*	B58-0375-04	CAUTION CARD		
	-		*	B58-0387-04	CAUTION CARD		
	-		*	B58-0388-04	CAUTION CARD		
	-			B59-0092-00	SERVICE DIRECTORY	UUE	
⚠	11	1C		E03-0036-05	AC OUTLET	UMUE	
⚠	12	1C		E30-0459-05	AC POWER CORD	E	
⚠	12	1C		E30-0812-05	AC POWER CORD	UMUE	
⚠	12	1C		E30-1416-05	AC POWER CORD	T	
	13	1A	*	E30-1365-05	CORD WITH CONNECTOR		
	-		*	H01-5664-04	ITEM CARTON CASE	T	
	-		*	H01-7068-04	ITEM CARTON CASE	UMUEE	
	-		*	H10-1824-02	POLYSTYRENE FOAMED FIXTURE		
	-			H25-0148-04	PROTECTION BAG (110X230X0.07)		
	-			H25-0223-04	PROTECTION BAG (750X350)		
	-			H25-0232-04	PROTECTION BAG (235X350)		
	17	2B,2C		J02-0170-04	FOOT		
	18	1C		J12-0094-05	PIN		
	19	2B		J21-3326-05	JACK MOUNTING HARDWARE		
⚠	21	1C		J42-0083-05	POWER CORD BUSHING		
	-			J61-0307-05	WIRE BAND		
	25	2A	*	K27-1533-04	KNOB (BUTTON) TONE,BAL,MIC		
	27	2A	*	K27-1536-04	KNOB (BUTTON) ROULETE		
⚠	31	1B	*	L01-6842-05	POWER TRANSFORMER	T	
⚠	31	1B	*	L01-6845-05	POWER TRANSFORMER	UMUE	
⚠	31	1B	*	L01-6847-05	POWER TRANSFORMER	E	
	D			N09-1515-05	TAPPING SCREW (3X8)		
	F			N29-0035-05	PUSH RIVET (3.5X5.5)		
				POWER SUPPLY (X00-2362-71)			
	C1		*	C90-1391-05	ELECTRO 3300UF 35WV		
	C2		*	C90-1386-05	ELECTRO 2200UF 35WV		
	C3 ,4		*	C90-1382-05	ELECTRO 10UF 35WV		
	C5 ,6			C91-0769-05	CERAMIC 0.01UF M		
	C7		*	CE04KW1J221M	ELECTRO 220UF 63WV		

E: Scandinavia & Europe **H**:Audio Club **K**: USA **P**: Canada **W**:Europe
T: England **U**: PX(Far East, Hawaii)
UE: AAFES(Europe) **X**: Australia **M**: Other Areas

⚠ indicates safety critical components.

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	Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
	C8		*	CE04KW1H221M	ELECTRO 220UF 50WV		
	C9		*	C90-1380-05	ELECTRO 2200UF 16WV		
	C10 -12		*	C90-1382-05	ELECTRO 10UF 35WV		
	C13		*	C90-1390-05	ELECTRO 330UF 50WV		
	C14		*	CE04KW1H3R3M	ELECTRO 3.3UF 50WV		
	C15		*	C90-1388-05	ELECTRO 2.2UF 50WV		
	C16			C91-0647-05	CERAMIC 0.01UF P		
	C19			CE04KW1H010M	ELECTRO 1.0UF 50WV		
	CN1	1B	*	E08-1303-05	RECTANGULAR RECEPTACLE(13P)		
	CN2	1B		E11-0152-05	MINIATURE PHONE JACK(3P) CD		
	CN3	1C		E06-0519-05	CYLINDRICAL RECEPTACLE(REMOTE)		
	35	1B		F29-0014-05	INSULATING WASHER		
⚠	F1	1B		F05-1623-05	FUSE (SEMKO) (250V T1.6A)	TE	
⚠	F1	1B		F05-3022-05	FUSE (250V 3A)	UMUE	
⚠	F2	1B		F05-1521-05	FUSE (250V 1.5A)	UMUE	
	39	1B		J13-0041-05	FUSE CLIP	UMUE	
	39	1B		J13-0054-05	FUSE CLIP	TE	
	-			J61-0307-05	WIRE BAND	TE	
⚠	43	1B	*	L01-6932-05	POWER TRANSFORMER	T	
⚠	43	1B	*	L01-6935-05	POWER TRANSFORMER	UMUE	
⚠	43	1B	*	L01-6937-05	POWER TRANSFORMER	E	
	G	1B,2C		N09-0295-05	HEXAGON HEAD BOLT(M3X8,+)		
	R1 ,2			RD14AB2E681J	FL-PROOF RD 680 J 1/4W		
	R3			RS14DB3D271J	FL-PROOF RS 270 J 2W		
	R6		*	RS14DB3D5R6J	FL-PROOF RS 5.6 J 2W		
	R7 ,8			RD14AB2E101J	FL-PROOF RD 100 J 1/4W		
⚠	K1	1B		S51-1034-05	MAGNETIC RELAY		
	S1 ,2	2C		S31-2083-05	SLIDE SWITCH (POWER TYPE)	UMUE	
	D1 -8			DSM1A1	DIODE		
	D9		*	RD24F(B)	ZENER DIODE		
	D10 ,11			RD16E(B)	ZENER DIODE		
	D12 ,13			1SS133	DIODE		
	D14			DSM1A1	DIODE		
	D15 -24			1SS133	DIODE		
	IC1		*	TA78018AP	IC(VOLTAGE REGULATOR/ +18V)		
	IC2			AN7805*1	IC(VOLTAGE REGULATOR/ +5V)		
	IC2		*	TA78005AP*1	IC(VOLTAGE REGULATOR/ +18V)		
	IC2			UPC7805H*1	IC(VOLTAGE REGULATOR/ +5V)		
	Q1 ,2			2SC2167	TRANSISTOR		
	Q3			2SC1685(R,S)	TRANSISTOR		
	Q3			2SC945(A)(Q,P)	TRANSISTOR		
	Q4			2SA1127NC(R,S)	TRANSISTOR		
	Q4			2SA733(A)(Q,P)	TRANSISTOR		
	Q5			2SC2003(L,K)	TRANSISTOR		
	Q6			2SC1685(R,S)	TRANSISTOR		
	Q6			2SC945(A)(Q,P)	TRANSISTOR		
	AUDIO (X09-2202-71)						
	D11 -18	1A,1B		B30-0432-05	LED(LN31GCPH(U))		
	D19 -37	1A,1B		B30-0431-05	LED(LN21CPH)		
	C1 -14			CC45FSL1H151J	CERAMIC 150PF J	E	
	C15 -20			CE04KW1V100M	ELECTRO 10UF 35WV		

E: Scandinavia & Europe H:Audio Club K: USA P: Canada W:Europe
T: England U: PX(Far East, Hawaii)
UE: AAFES(Europe) X: Australia M: Other Areas

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
C21 ,22		*	C90-1379-05	ELECTRO 33UF 16WV		
C23 ,24			CC45FSL1H101J	CERAMIC 100PF J	E	
C25 ,26			CC45FSL1H220J	CERAMIC 22PF J		
C27 ,28			CC45FSL1H070D	CERAMIC 7.0PF D		
C29 ,30		*	C90-1378-05	ELECTRO 22UF 16WV		
C31 ,32			C91-0769-05	CERAMIC 0.01UF M		
C33 -36			CF92FV1H104J	MF 0.10UF J	E	
C33 ,34			CK45FF1H473Z	CERAMIC 0.047UF Z	UMUET	
C37 -40			CK45FF1H103Z	CERAMIC 0.010UF Z	E	
C41 ,42		*	C90-1393-05	ELECTRO 3300UF 50WV		
C43 ,44			CK45FE2H103P	CERAMIC 0.010UF P		
C45		*	C90-1384-05	ELECTRO 47UF 50WV		
C46		*	C90-1384-05	ELECTRO 47UF 50WV		
C47		*	C90-1387-05	ELECTRO 1UF 50WV		
C48			CE04KW1E470M	ELECTRO 47UF 25WV		
C49			CE04KW1H101M	ELECTRO 100UF 50WV		
C50			CK45FB1H561K	CERAMIC 560PF K	E	
C51			CK45FF1H473Z	CERAMIC 0.047UF Z		
C52			CC45FSL1H221J	CERAMIC 220PF J		
C53			CK45FB1H222K	CERAMIC 2200PF K	E	
C53			CK45FB1H561K	CERAMIC 560PF K	UMUET	
C54			CK45FB1H102K	CERAMIC 1000PF K		
C55 -58			CE04KW1V100M	ELECTRO 10UF 35WV		
C59 ,60		*	CE04KW0J471M	ELECTRO 470UF 6.3WV		
C61			CE04KW1V100M	ELECTRO 10UF 35WV		
C62		*	C90-1382-05	ELECTRO 10UF 35WV		
C67 ,68			CC45FSL1H151J	CERAMIC 150PF J	E	
C69 ,70			CC45FSL1H101J	CERAMIC 100PF J		
C76 ,77			C91-0753-05	CERAMIC 470PF K		
47	1C		E23-0125-05	TERMINAL		
CN7	2B	*	E11-0160-05	PHONE JACK (7P)		
CN8	2B	*	E11-0159-05	PHONE JACK (3P)		
CN9 ,10	1C		E13-0814-05	PHONO JACK (8P)		
CN11	1C		E13-0497-05	PHONO JACK (4P)		
CN12	1C		E20-0455-05	SCREW TERMINAL BOARD(4P)		
L1 ,2			L39-0085-05	PHASE-COMPENSATION COIL		
X1		*	L78-0209-05	RESONATOR (4.194000MHZ)		
G	1B,2C		N09-0321-05	TAPPING SCREW (3X10)		
CP1 ,2			R90-0187-05	MULTI-COMP 0.22X2 K 5W		
CP3			R90-0278-05	MULTI-COMP 100KX7 J 1/6W		
R43 -46			RD14AB2E331J	FL-PROOF RD 330 J 1/4W		
R47 ,48			RS14DB3D100J	FL-PROOF RS 10 J 2W		
R49 ,50			RD14AB2E2R2J	FL-PROOF RD 2.2 J 1/4W		
R53			RS14DB3D271J	FL-PROOF RS 270 J 2W		
R54			RS14KB3D271J	FL-PROOF RS 270 J 2W		
R55			RS14DB3D182J	FL-PROOF RS 1.8K J 2W		
R59			RD14AB2E820J	FL-PROOF RD 82 J 1/4W		
R60 ,61			RS14DB3D5R6J	FL-PROOF RS 5.6 J 2W		
S1 -10			S40-1064-05	PUSH SWITCH		
D1 ,2			1SS133	DIODE		
D3 -6			GP20DL	DIODE		
D7			DSM1A1	DIODE		

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D8			1S2076A	DIODE				
D9			1SS133	DIODE				
D38 -48			1SS133	DIODE				
IC1			AN6556	IC(OP AMP X2)				
IC2		*	UPD7508HC-049	IC(MICROPROCESSOR)				
Q1 ,2			2SD1302(S)	TRANSISTOR				
Q3 ,4			2SC945(A)(Q)	TRANSISTOR				
Q5 ,6			2SC3244(D,E)	TRANSISTOR				
Q7 ,8			2SA1284(D,E)	TRANSISTOR				
Q9 ,10			2SC2577	TRANSISTOR				
Q11 ,12			2SA1102	TRANSISTOR				
Q13			2SC1685(R,S)	TRANSISTOR				
Q13			2SC945(A)(Q,P)	TRANSISTOR				
Q14 -21			2SA1127NC(R,S)	TRANSISTOR				
Q14 -21			2SA733(A)(Q,P)	TRANSISTOR				
Q22 -25			2SC2003(L,K)	TRANSISTOR				
TONE (X11-2180-00)								
C1 ,2			CE04KW1V100M	ELECTRO	10UF	35WV		
C3 -6			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C7 -10			CE04KW1H2R2M	ELECTRO	2.2UF	50WV		
C11 -14			CF92FV1H473J	MF	0.047UF	J		
C15 -18			CE04KW1H2R2M	ELECTRO	2.2UF	50WV		
C19 ,20			CK45FB1H102K	CERAMIC	1000PF	K		
C21 -24			CE04KW1H4R7M	ELECTRO	4.7UF	50WV		
C25 ,26			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C27 ,28			CC45FSL1H221J	CERAMIC	220PF	J		
C29 ,30			CE04KW1V100M	ELECTRO	10UF	35WV		
C32			CC45FSL1H101J	CERAMIC	100PF	J		
VR1	2A	*	R13-5071-05	POTENTIOMETER(100KX2)		MIC		
VR2	2A	*	R13-5070-05	POTENTIOMETER(200K)		BALANCE		
VR3 -5	2A	*	R13-3026-05	POTENTIOMETER(10K)		TONE		
IC1			TC9176P	IC(2CH ELECTRONIC VOLUME)				
IC2		*	NJM2068D-D	IC(OP AMP X2)				
IC2		*	UPC4570C	IC(OP AMP X2)				
SWITCH (X13-5050-00)								
C1 -4			C91-0769-05	CERAMIC	0.01UF	M		
IC1		*	LC7820	IC(ELECTRO CONTROL SWITCH)				
SUB (X13-5192-70)								
C1 ,2			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C3 ,4			CK45FB1H471K	CERAMIC	470PF	K		
C5 ,6			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C7 ,8			CK45FB1H471K	CERAMIC	470PF	K		
C9 ,10			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C11 ,12			CK45FB1H471K	CERAMIC	470PF	K		
C13			CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C14		*	CE04KW1HR47M	ELECTRO	0.47UF	50WV		
C15 ,16			CK45FB1H471K	CERAMIC	470PF	K		
C17			CE04KW1V100M	ELECTRO	10UF	35WV		
C18			CE04KW1V100M	ELECTRO	10UF	35WV		
C19 ,20			CE04KW1HOR1M	ELECTRO	0.1UF	50WV		
C21 ,22			CK45FB1H471K	CERAMIC	470PF	K		
C23 ,24			CE04KW1H010M	ELECTRO	1.0UF	50WV		

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C25 ,26			CE04KW1HOR1M	ELECTRO	0.1UF	50WV		
C27 ,28			CK45FB1H471K	CERAMIC	470PF	K		
C29 ,30			CE04KW1H010M	ELECTRO	1.0UF	50WV		
D1 -16			1SS133	DIODE				
D1 -16			1SS176	DIODE				
Q1 -12			2SC1845(F,E)	TRANSISTOR				
PRE AMP (X85-1040-10)								
C1 ,2			CE04FW1H3R3M	ELECTRO	3.3UF	50WV		
C3 ,4			CC45FSL1H221J	CERAMIC	220PF	J		
R11 ,12		*	RD14AB2E271J	FL-PROOF RD	270	J 1/4W		
R13 ,14			RD14AB2E181J	FL-PROOF RD	180	J 1/4W		
Q1 -4			2SA992(F,E)	TRANSISTOR				
Q5 -8			2SC1845(F,E)	TRANSISTOR				

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